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Publication and Editorial Office

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VOL. XVIII OCTOBER, 1931 No. 10

EDITORIAL

Platers' Classes

By ALBERT HIRSCH, Chairman Bureau of Education

"Every man owes some of his time to the upbuilding of the profession to which he belongs."

THEODORE ROOSEVELT.

It is autumn and thought is given to the organization of classes for electro-platers. Last year thirteen branches out of twenty-seven had classes or approximately fifty per cent have been organized into classes. This is illustrative of the wonderful progressiveness of the A. E. S.

It is hoped that all branches will file a report of their attendance with the Bureau at the close of this school year.

Los Angeles Branch is the first to make application, this fall, to the Bureau for information about starting a class.

In conducting classes one has the choice of lecturing to large classes or have problem-solving small classes. As to the first part, experience has shown that lectures do not hold the interest of the platers. Therefore, problem solving will prove the most effective. Teach the plater simplified methods of analytical control of plating solutions and he will later ask you to teach him the use of the copper colorimeter, measure of polarization and throwing power.

Not too little can be said of the chemists who not only helped to organize the classes, but even became instructors. All of the branches were more or less successful with the classes. As success can only be measured by the attendance, I am reporting the attendance for the past three years of the Baltimore and Washington Branch, the only branch making a report.

SUMMARY OF ATTENDANCE
Baltimore-Washington Branch
CLASSES FOR ELECTRO-PLATERS

	1928-29	*1929-30*	*1930-31*
No. of lessons	8	7	15
Enrollment	27	24	25
Average attendance—No.	16	17	19
%	59	71	76
Attended 75% of the classes—No.	11	13	15
%	40	54	60
Attended 100% of the classes—No.	5	5	3
%	19	21	12

The Bureau wishes to call attention to the fact that lesson sheets are being prepared for the analysis of nickel, cyanide copper, chromic acid and gold solutions. These sheets will be arranged in detailed operations, and in the hands of a plater will enable him to analyze his solutions. In the hands of an instructor the sheets will serve as a means of presentation.

CREDIT

The article entitled "Foremen Platers Indispensable" appearing in the September REVIEW was taken from the editorial columns of a recent issue of the *Metal Industry*.

Mr. T. Traudeaur, business manager of the *Brass World* and *Metal Industry*, called our attention to the article mentioned, and we were glad to reprint it for the benefit of our membership.—*Editor*.

IMPORTANT ANNOUNCEMENT

Mr. Walter Fraine, member of Dayton Branch and past president of the A. E. S., has been appointed secretary-treasurer of the Research Committee. This important office has been held by President Sievering, who has just appointed Mr. Fraine as his successor.

BARREL ROLLING AND PLATING

By R. J. O'Connor

Read at Rochester Convention, 1931

In the past ten years, there has been a very great improvement in the plating of small parts. It was not long ago when it was common practice to color buff and basket plate almost everything of this nature, where a passable finish was required.

At the present time, very good results are obtained by the various types of rolling, from common pins, sheet metal pieces up to 12" in length in all shapes—to malleable and grey iron and brass castings weighing one pound each. It is the intention of this paper to try to outline the best methods of rolling and plating to obtain the best results.

Cut Down Rolling (Castings)

For a high and smooth finish on castings, a horizontal barrel has been found to be the most satisfactory. It is customary to use slugs or balls to help in the cutting down process, and in some instances it is absolutely necessary. However, in plants where large varieties of shapes are handled, different types are mixed together—one for example that will reach the recesses of the other. Care should be taken not to mix pieces that will either nest or break the other. The work is then taken and placed along with a quantity of either builders' or sea sand in the barrel, enough water is added to cover the work, and run at from 30 to 40 revolutions per minute. The length of time required for a good finish depends to some extent on the shape of the casting. However, for the general run of work the following is satisfactory: Malleable iron 35 hours, grey iron 75 to 80 hours, brass and bronze 12 hours. The vents should be opened about every 5 or 6 hours. It has not been found advantageous to change the sand, as it does the heavy cutting when rough, then breaks down and performs the second operation. The castings are then freed from mud and in the case of iron, given a light muriatic acid pickle, while the brass and bronze are bright dipped and placed in a ball barrel that has been wood lined, and rolled in balls with a mixture of soap chips and a small amount of sodium cyanide for 12 hours. The work is then removed from the balls, rinsed in hot water, and dried by rolling in sawdust, and is ready to plate.

Ball Rolling

When work comes to the finishing department that requires ball rolling as a first operation, it must first be cleaned of grease and scale. The time for rolling depends on the nature and shape of the parts. Small pieces that roll freely without scratching can be brought up bright in about one hour by using a barrel that rotates at a high speed—say 35 revolutions per minute. On flatter and larger surfaces, the speed of the barrel must be cut down to suit the article. I have in mind a job that we were giving a one wheel operation and still plating. It was found necessary to cut down the cost of finishing, even if we had to sacrifice the quality slightly. This piece was made out of cold rolled steel, about 10″ long, 5″ wide, but fortunately was turned up at both ends, and it was therefore possible to pack it in a horizontal ball barrel in such a way as to hold it stationary while in process and let the balls roll around to bring up the luster. It was then still plated and again ball rolled, in this way scratching was cut to a minimum, and a very high finish produced. Chip soap is the most commonly used material in the above process, although in some cases a small amount of cyanide is added in addition to this.

Sawdust Rolling

Very good results can be obtained by sawdust rolling in an oblique barrel. It is advisable to use hardwood sawdust. Here the material can be taken just as it comes from the press. If the work contains too much oil, however, it is well to use old sawdust for a preliminary rolling—that is, the work is first taken and rolled for about 15 minutes in sawdust which is kept in a separate box and used only for the purpose of removing grease. This is sieved out at the end of the above time and put back in the same barrel and covered with clean sawdust. The length of time given this material at this stage depends on the nature of the work. For example, machine screws can be brought up to a very high finish in about 1½ to 2 hours without any danger of spoiling the threads, taking care to use enough sawdust so that the screws will not roll too much on each other or on the outside of the mass. This also applies to wood screws. A very fine sawdust should be used for this purpose so that the kernels will not clog the threads or slots. This method also applies to all machine screw products, and has been found to have a distinct advantage over wet rolling, in that it gives a much higher color in the same length of time, with

less danger of ruining the finely machined parts. Also, on many other wire parts and a great many of the smaller sheet metal pieces, the dry sawdust method is found simpler, more economical, and better than the wet method.

Wet Method

The term wet rolling as most of us understand it means rolling in an oblique barrel, using potash, sal soda, sodium cyanide, soap, soap bark, cream of tartar or a combination of some of the above with enough water to cover the work where the material is of such a nature as to burnish on itself, so that it is not necessary to use balls. This applies to tubular rivets, safety pins, eyelets and the like. The length of time required here again depends on the finish wanted, shape of pieces, etc. We process quite a variety of work in this way and found after using soap, soap bark, cream of tartar in various combinations that on material that had to be tumbled for a short time, these worked out very well; on pieces that had to run say 6 to 8 hours, it was not so satisfactory, as it was necessary to change the water every hour or so. We therefore adapted the potash and cyanide mixture and can run work in open barrels for about 8 hours without changing. On some types of work, good results can be obtained by running in a horizontal barrel with any of the above mixtures and adding some clean hardwood sawdust. This works out very well, but its use is limited.

Barrel Plating

Very rapid progress has also been made on the method of plating small parts automatically or by the barrel process. The large Jumbo type with wood or canvas panels has given way to the smaller and more efficient plating unit—size 30 x 15 barrel. Celluloid or Bakelite is the most commonly used paneling, the latter predominating, as celluloid can be used only in nickel plating practice. With the proper cathode contacts it is no longer necessary to use 12 volts, as 6 volts gives a deposit that is satisfactory in both thickness and appearance. The length of running time depends on the type of solution being operated.

Plating Solutions

There is a wide difference of opinion as to the ideal solution from a standpoint of composition. I can only give the formulas that have been found satisfactory by myself and others in New England who systematically analyze their solutions and who process a large amount of work by the above method.

NICKEL

4 oz. nickel per gal.
pH - 5.8 to 6.0
2 oz. chloride per gal.
2 oz. boric acid per gal.

BRASS

2 oz. copper per gal.
.75 oz. zinc per gal.
1 oz. free cyanide per gal.

In some places, they have found it impossible to use this mixture where they are plating hardened parts, springs and the like of that. They have to cut down very materially on their cyanide, the solution running 1½ to 2 ounces of free cyanide embrittles that type of work. So by sacrificing their metal concentration and free cyanide much lower, it is possible to get fairly good results, but not quite as good with this mixture. In other words, this is good for all general lines of work and has few exceptions.

COPPER

2 oz. copper per gal.
1 oz. free cyanide per gal.

Copper solutions are run hot in a barrel about 120° F. and they work out very well with two ounces of copper per gallon and one ounce of free sodium cyanide. No brightener is used in any of these solutions at all.

CADMIUM

2 to 4 oz. cadmium per gal.
2 to 4 oz. free cyanide per gal.
1 to 2 oz. total alkali per gal.

Cadmium, again, seems to work better; in fact, we have run it where we have only had two ounces of cadmium per gallon. We have got very good results by running our cyanide up as high as four ounces per gallon. However, on some parts this was rather dangerous, as it had a tendency to blister. If you get right in that range, you keep right in the range of 2 to 3 ounces of cyanide, where you have two ounces of cadmium, you will get very bright deposits.

When we started our cadmium solutions, we made additions of postum for brightener, but we get fairly bright deposits now, with-

out making any brightener additions at all, as long as we keep our cadmium down and our cyanide fairly high.

We ran into a peculiar thing in the plating of malleable iron castings in a cadmium bath. We plate a great many castings just as they come from the foundry or sand blast, and never have any trouble with them peeling. We can run our solutions very high in cyanide. But where we cut down and roll some of these malleable iron castings we experience a lot of difficulty with blistering. The only thing we have done to eliminate that was to cut our cyanide content way down, but at the best we still have quite a little difficulty with these malleable iron pieces that have been cut down and then cadmium plated. Some batches of work, whether it is the fault of the foundry or something, I don't know, seem to plate all right; we experience very little trouble with peeling, and run along for about a week, and then the next week we will probably have one day or one batch of castings that will peel very badly and blister.

I haven't gone into zinc very thoroughly, although we operate some zinc barrel solutions, about six; only that we try to keep our metallic zinc about four ounces. We add some aluminum sulphate, about two ounces to the gallon, and find very good results where we add about as much chloride as we can safely get in the solution. We use sodium chloride, and at the present time we are running about eight ounces of sodium chloride per gallon in our sulphate of zinc and getting very good results. Here, acid is also added every night to feed the solution. In the morning, if we get any free acid in, it digests itself on the anode and kind of kills the effect, so that it is fairly neutral or slightly acid when we start in the morning. We get better results by running our acid zinc very slightly acid.

Now, regarding the handling equipment in barrel plating, we all endeavor to have overhead handling. It is surprising the number of plants, however, that you visit where there is still, we call it "buggerlugging the work around." It is very easy to get a block and an I beam and use all overhead handling, where possible.

Automatic sieves, too, cut down the work to a great extent, and are comparatively easy to operate. Some people, in some plants, have a blower system where they just put the work through the blower system and the air sucks the sawdust free from the work and puts it in a container, and then that can be tapped for fresh sawdust. That is also a very good method of handling. That is about all I can think of on barrel plating.

CHAIRMAN KENNEDY: Are there any questions?

MR. KELLEY: The speaker mentioned free cyanide in brass solutions of one and one half ounces per gallon runs into embrittlement. I wonder if the same is true in cadmium solutions?—In the case of spring material.

MR. O'CONNOR: Yes. In the case of spring material for cadmium, we have to cut the cyanide down very much. We find, however, the tendency in most of these cases seems to be where the material is hardened it also contains some scale, and as a general rule that scale is pickled off, and that runs into embrittlement.

Anything that we can roll, we remove the scale by rolling in pumice, and cut down our cyanide content in our cadmium plating barrel, and in that way we get away from it.

MR. KELLEY: One other question. In the cleaning of copper and brass parts, you tumble those in sand. Have you had any trouble in the following plating operations getting a bright finish on them, due to the sand being imbedded in the copper parts.

MR. O'CONNOR: No, that sand rolls fairly clear. Of course, as I said, there in the recesses, where you have recesses in your cadmium, you can't use sand; you would have to use a pumice and roll a little longer. But, of course, that work is afterwards ball rolled that I have reference to there in the sand tumbling. Probably where you get your sand imbedded is because the grains of sand get into the recesses of your work. If you use pumice in the place of sand, you won't have that trouble.

MR. F. E. TERRIO: What kind of sand do you use?

MR. O'CONNOR: We used to use sea sand. We used to go down to the beach and get it. We were right near the shore. But they stopped that practice of taking sand away; they probably thought we would take it all out of the ocean or something, and we went to builders' sand, and we find no difference between sea sand and builders' sand. In fact, we rather favor the builders' sand, but on some types of work sea sand works a little better because it is a little harder at the start. Regular builders' sand that has been sieved out free of pebbles works out very well.

MR. W. F. FOX: May I ask how your weight of work compares with the balls used?

MR. O'CONNOR: It depends entirely on the work that is to be done. In some work you can use an equal quantity of balls and work. Naturally that would not be very many balls, because your work is

lighter than the balls. But you have to experiment to find out just how much ball you should use with your work. Where your work is flat, and has a tendency to scratch too much, then very ofttimes you have to use 2 to 1, and be very careful about the speed of your barrel. I mean you must cut down on your barrel speed where your work is inclined to scratch, and that will do away with the scratching and bring out a better efficiency, although you have to run a little longer.

MR. F. J. HANLON: I don't remember whether you mentioned whether you had any particular recommended speed for your barrels.

MR. O'CONNOR: No. We use all speeds for various types of work. Of course, we are job platers and have got all types of work, and you have to use the type of speed that will fit your work. Very ofttimes you will have to experiment. You get so you know, however, after a certain length of time, just what to do. Very ofttimes you spoil a couple lots of work before you find that out.

MR. H. H. WILLIAMS: In respect to the speed, I have done considerable of that sand burnishing work in the past, and found the speed is simply a question of having your work roll instead of throw; have it so that it will roll down on the slant. There is where you get your burnishing or cutting, and I think the most speed I use in the 18″ diameter barrel is 40.

Now, another thing on the sand proposition. There is a great difference in sand and builders' sand. St. Louis,—at first we used to get the Mississippi River sand, but we found that the sand on the Merrimac River, a smaller stream, was much sharper, and that is what we were after, because the castings we tumbled were very rough, and we found that even this difference in the sand between the two rivers made a great difference in the length of time needed for cutting down rough castings.

MR. F. E. TERRIO: Have you ever used the sand that is used for sand blasting?

MR. O'CONNOR: Yes, we have used that where, as Mr. Williams said, the castings were rough, and in the case of gray iron castings very often you can cut down your rolling time by using quartz or any of the harder silicates.

MR. THURBER: I would like to ask Mr. O'Connor one question about the device for holding larger pieces in ball rolling. You mentioned a ten-inch piece where you had some device for holding it.

MR. O'CONNOR: There are devices,—I don't know whether they are commonly used, because there is quite a little trouble to set the pieces in devices, but this particular piece I had reference to (and we process a lot of these by the same method) happened to pack into the barrel in such a way as to hold itself. It had ears on it, so that one would rest up against the other, and, of course, you had a rather white spot at that particular point, but on some work that doesn't make any difference. I had reference to just packing in the barrel, without any device. Although there are devices used that will hold work stationary while in the ball-rolling process, on the larger pieces. But I have never used them. I have seen them.

MR. F. F. OPLINGER: One thing in connection with this paper which I think would be interesting to have a digression of opinion on, Mr. O'Connor, is where production requirements are large, on say, for instance, the production of small malleable iron or gray iron castings, which is the most economical and the most practical to use—sand blasting or barrel rolling?

MR. O'CONNOR: Well, you see, the barrel rolling we are talking about here has no relation to sand blasting. Sand blasting merely removes the sand as the castings come from the moulds. We are talking about cutting down rolling. We are assuming most of these castings come from the foundry sand blasted. It is very necessary to sand blast everything that is to be rolled. Of course, in some cases, you can roll a burr off, roll the skin off the castings by the cutting down process, but there is really no relation to it here. But I think I can answer your question. It is more economical to roll in the foundry instead of sand blasting; in place of sand blasting. However, it is harder to plate the material after it comes from the rolling barrel. The sand blast is the most practical, although it costs more, for plating purposes. In the case of japanning, barrel rolling is plenty good enough.

MR. W. F. FOX: Have you ever had trouble with breaking down the corners?

MR. O'CONNOR: I have found from my experience that anything that will remove the scale and bark off of your brass castings will also remove your corners and also blunt your corners.

MR. G. A. WILSON: I would like to verify a statement in regard to the sawdust proposition. Now my work is almost exclusively screws and small articles of that kind. My experience has been that however fine you may sift your sawdust, in the smaller screws, you

get grains of sawdust imbedded in the slot. In turn, you have specifications that call for a certain length of time in your salt spray, and you will find that that will break down while you are looking at it. You don't have to put it in your salt spray to see it break down. Now, we changed from that to sand, and we ran into the same difficulty. We have changed from the sand to pumice. The pumice is a little expensive, but we got off grade.

MR. O'CONNOR: Of course, here, you are speaking of using pumice on machine screws before they are threaded?

MR. WILSON: These are threaded and hardened.

MR. O'CONNOR: That is a little different story, of course. What I mean is where you speak of rolling machine screws in sand you can't give them very much sand rolling without spoiling the threads, but these pieces are hardened. Yes, as Mr. Wilson says, on the smaller machine and wood screws it is rather impossible to get a sawdust that will not clog the threads. However, in the majority of cases, that doesn't make any difference, only where the specifications, as he says, are rather rigid.

THE FOREMAN IS MORE THAN A BOSS

By Thomas R. Hughes*

From April, 1931 issue "National Safety News"

To put it in a single sentence, the foreman is "a man who can get the work done." But to accomplish this he must have unusual qualities of persistence, justice, initiative and knowledge.

The ideal foreman is persistent in his study of men and materials and the operation of his department, and he will continually instruct and correct his men in their work.

He is just in the treatment of all his men and will have no favorites. He treats them all alike according to their conduct and ability.

He will be able to carry on his work from general instructions, if necessary, without detailed orders from the management covering the supervision of his department. He can visualize his department in its relation to the whole plant and so co-ordinate its work with that of others for the best results.

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*Secretary, Safety Committee, Hazard Insulated Wire Works Division, The Okonite Company, Wilkes-Barre, Pa.

His knowledge covers the room or space in which the work of his department is carried on, the equipment with which he works, the materials to be handled, and he knows intimately the capabilities of his men.

The foreman studies this fourfold problem of factory space, equipment, materials and men so as to produce with the utmost economy a first-class product. He will see that his work-places are kept in good shape, both for the welfare of his men and to speed the work to be done. He will see that his equipment is kept in good repair. He will see that his materials are of good quality and properly handled in the operations; and he will instruct and assign his men so as to get maximum results.

While the chief thought in the foreman's mind while he is arranging these fundamentals may be production in his department, a very close companion to this thought will be the safety factor, and he will realize that all that he is doing to insure a high degree of efficiency contributes directly toward production with safety. The ideal foreman will exercise his four high qualities of persistence, justice, initiative and knowledge to promote safety in his department just as he employs them to promote production.

He will see to it that workroom floors, walls and ceilings are safe and in shape for effective work. He will make sure that there is proper light and good ventilation. He will see that machines are adequately guarded. And he will preserve good housekeeping conditions so that his men may work safely and efficiently.

He will be alert for signs of fatigue and for illness among his workers, because he knows that these often lead to accident. He will keep in as close contact with his men as possible and advise them on matters of health as well as the operation of their work.

The foreman knows that the management of his plant is alert and keen to provide a safe shop for its workmen, because a safe plant and careful, intelligent workmen mean increased production and a better product; whereas a plant with a number of workmen sick or injured cannot turn out a good product in maximum quantity.

Moreover, the foreman will keep in close touch with the plant safety committee, attending its meetings each month. He will assist whenever possible in its study of accident reports and in carrying out plant inspections, and he will co-operate with its instructions and recommendations which seek to correct conditions and practices that may be unsafe.

ROUND TABLE DISCUSSION ON PLATERS' CLASSES

At Rochester Convention, 1931

1. **General**
2. **Educational Bureau**
3. **Certificates**
4. **Fees**
5. **Equipment**
6. **Speakers and Expenses**

CHAIRMAN H. GILBERTSON: On account of not being able to reach the round table discussions on Wednesday, we are now to take this subject up, and in order to reach the entire program for this morning, it will be necessary for us to move along promptly. So I will ask everyone to kindly co-operate in that direction. Dr. Blum will take charge of this session.

DR. WM. BLUM: When I read the printed program and the subject that was put down here, "Round Table Discussion on Electro-Plating in General," I received a slight shock, because it was equivalent to saying that we could discuss everything that is the subject of work of this Society, because, of course, that is the work of the Society and the purpose of the Convention—electro-plating in general. As a matter of fact, I had been asked previously by the local committee to preside at a session on the education of electro-platers, and as I thought over it, I came to the conclusion that there was no contradiction between the two titles, because the whole subject of electro-plating, so far as it concerns the electro-platers' Society, is the problem of the education of electro-platers. This Society is a society for the advancement of education, the science of plating and the education of its members. It is an educational society, and so when discussing today this work on education we are really at the root of the whole matter; the purpose, aim, and justification of the Society is the education of electro-platers.

Now, as you know, the work that has been carried on in the various branches during the past many years has in some cases been productive, and in other cases less successful, and as a result of a similar discussion last year a Research Bureau, which was provided by the Constitution, was revived, and that committee has been at work during the year in formulating plans in this direction. So I think the best thing we can do this morning to start off this discussion is to call on Mr. Hirsch, the chairman of the Educational Bureau, to give us a brief summary (he already reported to some extent at the business meeting Monday morning), but even at the risk of repetition, to give us a brief summary of what the Educational Bureau has done during the year and what their plans are for the future.

MR. ALBERT HIRSCH: The Bureau of Education was organized by our Supreme President, George Gehling, as a result and wish of the Washington Convention. This year's work has been one of collecting data and building an organization for the years that are to come. A circular letter, setting forth the purpose of the Bureau, together with a questionnaire as a means of collecting data, was sent to all branches, only fifteen out of a possible twenty-seven answering the questionnaire.

After a lapse of several months, President Gehling appointed nine district chairmen and personally interviewed some of them; these chairmen were fortified with "The Course of Instruction" as outlined by Dr. A. K. Graham for a platers' class and printed in the Philadelphia Branch Year Book.

Quite a number of branches have started classes, which have been well conducted during the past winter. One branch suggested that we draft a diploma.

The latest work of the Bureau was the sending of a circular letter to many manufacturers to secure and list such speakers as they have for the fall meetings of the branches.

Important facts: Thirteen branches out of fifteen that answered the questionnaire have classes; one postponed starting a class, the other doubtful about starting.

Judging from the letters that come to the Bureau from the branches that are anticipating starting classes, they expect the Bureau to have ready to send out a printed course of instruction for a platers' class, a thing we do not have. Others write for a list of speakers; others think we should be in a position to send speakers. As to the speakers, if the Bureau could maintain a list of speakers with an itinerary, and had some means of financing such a proposition, it would be helpful to the branches, and a better system of lectures could be had.

In addition to that, I want to mention, of the nine district chairmen that had been appointed, Los Angeles Branch was the most prominent, Mr. Rynkofs answering the questionnaire immediately, sending out the circular letters, and turning in a report of the firms whom he had sent them to.

Mr. Harold Faint, unfortunately, cannot be here. I heard from him, and he has been doing very active work, and is unable to attend this Convention.

Bernard Lewis, another chairman, I met this morning, and he has sent in a complete report with a syllabus of the class as used in Detroit. Detroit, I believe, started the class this year.

Ellsworth Candee, another chairman that I had an opportunity to meet,—they are interested more in speakers than in platers' classes. The only means that we have of recording the results of our Bureau is such reports as are voluntarily sent in. So the only speakers that I have record of the work they have done this year are Dr. Blum and Mr. George Hogaboom. Dr. Blum had spoken at two different branches. Mr. Hogaboom spoke ten times, at nine different branches.

DR. BLUM: Now, with this introduction, I am taking the liberty to suggest that the purpose of this round table discussion this morning is to clarify our ideas in such shape that the Educational Bureau can be guided in their activities. I take it that it will not be necessary or desirable for this group, which is really an educational session, to take any formal actions or votes on any of these matters that come up, but rather to express our opinions freely. If there are any recommendations which we believe require action by the Society, they can be brought up at the business session this afternoon. I mention that because we can then conduct this in a much more informal way if we can feel in advance that this does not have for its purpose taking formal action, but merely to discuss such subjects as will be of interest and will assist the Educational Bureau and the branches in carrying on the work.

As Mr. Hirsch indicated, there are two major activities of that committee; that is, the work relating to the conduct of classes for platers, and that relating to the providing of speakers for the meetings. And while the two may be related in the committee in the sense that they may have to decide which they will give their principal activities to at a certain time, I think that we can discuss the two subjects rather independently, because it is only incidentally that they overlap. So that I believe that we can first take up to advantage the subject of platers' classes.

All of us who were there remember the long and interesting discussion with the detailed reports from each branch that were given last year regarding the classes and what they had done and their success, and particularly the fact that Milwaukee didn't have a regular program. We all enjoyed that very much. Now, in thinking over this work, and in giving my own personal views, they are

largely governed by the experience with the Baltimore-Washington Branch, and I will speak frankly and, of course, quite impersonally in connection with that, simply as giving my reaction on certain points. The Baltimore-Washington Branch is not by any means one of the largest branches in the country. Something like forty members. We are not particularly well provided with any large plants or with platers who have had any large amount of technical training or education. We represent, perhaps we may say, the average run of electro-platers in the country who have not had the benefits of technical surroundings or assistance. Therefore, our experience may be applicable to some other branches, or to members who are similarly situated.

Let me tell you briefly the experience of the Baltimore-Washington Branch with the platers' classes. We have had classes there for three years. Remember that having these two cities about fifty miles apart makes it a little bit less convenient to get together often, and during the first two years these two classes were held we just had one class a m[illegible] at the Bureau of Standards. Last year we had two classes a month, that is, fifteen classes in all during the season, and difficulty was experienced, frankly, in the members getting back and forth between the two cities, because fifty miles in the middle of winter, with snow on the ground, often makes it inconvenient to get together. In spite of that, let me make it clear that our enrollment and attendance have been very good; that for the three years in succession we had almost the same enrollment, 27, 24 and 25, with an average attendance going from 60% to 70% to 75%, so that each year we improved. So, you see, there is no reason for discouragement or anything of that sort. Nevertheless, we do have problems,—the difficulty of deciding just what to do and how to do it in order to meet the interest of all the members. In these three classes, that is, the three courses given in succession, we were more or less feeling our way. The most complete course was that given this last year of fifteen lessons on the analysis of plating solutions, in which we attempted to cover in some detail all of the essential methods of analysis of the common plating solutions.

Now, when we got through this year, and got together at our last business meeting, the question naturally came up, "What shall we do next year?" And that leads to what I believe is the most important question in this whole subject of education, and that is, what shall be the sequence of courses in platers' classes? It is easy

enough, if there is any interest and enthusiasm, and someone to take an activity, to get a class together and say, "We want to know something about the analysis of plating solutions," and you get together a list of directions for the analysis of plating solutions, and get the platers at work, and get them more or less acquainted as opportunity offers with the methods of analysis so that at least they can carry through the mechanics of analysis, that they get used to using these things, and so forth.

Now that has probably been the principal direction in which most of the branches have worked. But after they have had such a class, after they have gone for one or perhaps two years to such a class, the question then comes up, "What then? What shall we do?—Shall we do the same thing year after year? Shall we simply go on repeating these analyses and becoming just a little more expert each year, or not?" That question is one for serious thought, and I am going to tell you that when we had our meeting of the branch a month or so ago it was with some misgivings. You see, we had had the class for three years, and it was a question now, "What will the members be interested in? Do they want to have a class? Do they want to go ahead? Shall we have a class next year, and, if we do, what shall we take up?" And I was very much surprised at first, but, as I thought over it, very much pleased when several of the members,—and those were the ones who were most backward, if I may use the expression, that is, those who had had the least opportunity for technical contact,—several of the members got up and said, "We have learned, now, something about how to run analyses and so forth, we can run through these directions, if the directions are complete, we can carry it through now, we can pour in this, and titrate with that, but we want to know what it's all about. We don't understand why. We are carrying out these directions mechanically, because you told us to do it; you told us that we should add this and that and to calculate in this way and that, and that is very helpful and useful, but we don't know why." And that was to me a very interesting and very encouraging sign, because it convinced me that the platers, when they once get to see the value of chemistry, and the application of chemistry, want to know more of the fundamental principles of chemistry.

Last year I mentioned at a similar conference that I had started out years ago with the idea that this business of trying to teach platers to analyze solutions when they didn't know any chemistry

was a mistake, and I used the illustration that since then my eyes had been opened there, that I realized that the teaching of chemical analysis to the platers was probably the very best thing that could be done at the beginning to get their interest, to convince them of the value of chemistry. But having done that, I believe that we have to look forward a little bit further, and we are planning,—we haven't gone into any detail,—we have planned next year for a series of what will be more lectures than laboratory work, in which we will try to explain the simple elementary principles of chemistry that platers use, all along, in running their solutions, and in analyzing the solutions. Then, when the question comes up a year hence as to what we shall do, it remains to be seen, but I am inclined at this time to feel that we may go into what we may call electrochemistry, and try to teach them more of the principles of electrolysis, and the meaning of these words of polarization and anode efficiency and cathode efficiency, and so on, these terms that we use but with which we are not perhaps as familiar as we should be.

The point that I am leading up to is this, that the Educational Bureau may very well feel that their first aim should be to get out a course of instruction in methods of analysis of plating solutions, because that is something that everybody is interested in, that every plater is likely sooner or later to make use of. But, on the other hand, I believe that we should look forward to something like a three-year cycle of courses, then by the time three years have gone by, with the increased knowledge of chemistry, they can go back and take another course in the analysis of solutions, and with their increased knowledge get a great deal more out of it than they got out the first time.

I think we might make that the first subject for a brief discussion. I say brief simply so that we can try to cover the whole field that we have outlined here as to the experience or views of the members regarding the different subjects to take up in platers' classes in successive years. Let us hear from some of the members on that subject.

MR. GEORGE GEHLING: Mr. Chairman, you laid special stress on the fact that the Educational Bureau should issue an outline of some sort that they could send to the branches so that they could start a class and use that series of instructions in going and making a study of analysis. It sounded very simple when it was first spoken of. I went through it; I have had the pleasure this year of going

through that. I have studied last year's report of the Washington Convention all the way through,—the suggestions that were made, —and tried to use those suggestions. We have written to every one of the branches, and the surprising fact was that we received two answers out of twenty-seven. Two branches submitted a plan they were using. That was Detroit Branch and Philadelphia Branch. No other branch submitted anything, even though they were asked.

We had quite a discussion on that in Washington, because they figured that what would be good in one section of the country wouldn't be any good in the other, and that being the case it would be necessary to ask all the different branches all over the country to send in what is good for their section, and with the excellent result of two branches replying. I am going to tell you, it is disheartening; it shows how much they were interested and how much they wanted it.

At the same time, a definite plan had been sent to every district chairman in printed form. They didn't even read it. Had they read it, they would have answered, but they didn't read it. They knew more about that and what was in that than I guess the fellow that wrote it knew. So it wasn't necessary to read it, nor was it necessary to pass any comments about it. And so they didn't pass any, nor did they say anything. That sort of thing holds up progress; it takes months of hard work corresponding with people, and when you don't even get answers it is the most discouraging thing there is. That is why we had to put into effect a sort of lecture itinerary. We found one of the greatest drawbacks was the lack of interest in the branches, the members of those branches themselves. We had stated at Washington,—it is a shame that we have to go through all that stuff again and waste time on it,—but the fact was it had been explained in Washington, Philadelphia in itself had explained how we became interested. We had a series of lectures given by a technical man in the University of Pennsylvania, and we found out the series of lectures wasn't what we wanted. We spent one year with a series of lectures, and we paid for those lectures,—they were not voluntary,—because we wanted to feel that we were paying for something, and we wanted to get the good out of it. Most people have it in their mind anything they get for nothing can't be much good, and I am positive that our members all feel the same about it throughout, and if you send them something, just as the Educational Bureau was sending them something for nothing, it was no

good, they didn't read it. So we paid for these lectures, and after spending a year going through them we found out that it wasn't what we were after. But we were happy to say that at least it had awakened an interest in the members as to what they really did want, and they discovered then that they did want a class, and the next thing to do was to get a class, and in any text-book you can get full instructions as to how to make an analysis of anything. You simply have to take any book that you want along that line, and you have got your curriculum. But you have got to have the individuals interested. You can start here and read a paper, and half of them will listen to it and the other half will be chewing the rag and talking to somebody else, and when you are all through they will ask you what it is all about. The people themselves have got to be interested in it. So that we are going out now,—it is going to be a hard job, it can't be accomplished in no time,—trying to get speakers in different sections. You can't expect people to travel from one end of the country to the other, paying their own expenses, and meeting a few men. We have got to get meetings there in those places and get those people interested so that they will know what they want, and just as soon as they know what they want, and want to go after it, you will get it. Because there is nothing in this world, if you really want it and you want to fight hard enough for, that you can't get. And that applies to anything. It is only when you get careless and you don't care whether you want it or not, and then you stop, you don't go after it. And it is the same way with the platers' classes. And the fact that we received fifteen answers to the questionnaires out of twenty-seven proves that there were twelve of them that weren't interested, and it was those twelve branches who needed that interest in their branches to hold their meetings more than the other fifteen, for the reason that the fifteen that did answer were interested, were holding good meetings, the branches were functioning properly, and thirteen of those branches have held classes. One branch wanted to award diplomas as in the last year, and requested that we furnish diplomas. So that it is necessary now, in these other twelve branches, to get them together. Those are the branches where the members don't come out, they don't take an interest in their branch, and the branches are wavering and so forth, and that is a bad condition.

One of the best branches that we were proud to speak about had gone through that condition, and that was Boston. They were totter-

ing and were very low. They weren't doing anything. But, somehow or other, a little enthusiasm was worked up. Boston doubled its membership during the past year, and that can be done in the other branches just the same. So we are trying, as missionary work, to see if we can't get an itinerary throughout the country where each district chairman can see in his district that a branch has an interesting subject which will draw the members to the meeting, and after they get the members to the meeting and those members hear these lectures and these discussions, they will want a class. And until that is accomplished they won't care anything about a class or definite plan or anything else, because they know all about it, but we can't get it together. Now that is your answer.

DR. BLUM: I think Mr. Gehling has pointed out very well that the meetings with speakers, especially speakers from outside, will furnish a good opportunity to develop a stimulus and encouragement for having classes in the branches. He has also pointed out, of course, that we need the active support of the branches, and one of the good things that I hope will come out of this meeting is that you folks will go home and find out whether your Secretary, or whoever has charge of that, has answered the correspondence and sent in the reports to the Educational Bureau.

MR. GEORGE HOGABOOM: It has been my opportunity to visit a number of branches this year and discuss the educational features. My opinion is that nearly every member wishes to become a member of a class, if the opportunity is afforded him. There only seems to be one drawback, and that is that in some of the classes the instructor, even with the best of intentions, has used chemical symbols right at the start and scared the fellows. The best classes that I know of are those in which they have started off without any chemical symbols and just used plain terms.

We have brought in, in our plant at Mattewan, quite a number of men to teach the mechanics of analysis, and our experience has been that we must not use one symbol in the beginning with the new men. The moment you use a symbol a man becomes confused; the moment you give him an equation he is lost. And I think that that is one of the things that should be given close attention, and, when a program of study is laid out, that it should be as elementary as possible, and keep away from technical terms. Just as soon as a fellow becomes acquainted with these terms, then he will begin to ask for more and will learn the symbols, and just absorb them, and,

first thing you know, he is talking about them without any difficulty.

I know of a class that was organized, and they went through a very successful year, as far as the teaching is concerned, and as far as the program was concerned, but as far as what the fellows have learned it has been poor, for the simple reason that a good deal of it has been over their heads. But the fellows still kept up their interest. The attendance was excellent. The attendance was over 90%. But the fellows have felt that they didn't get as much as they could have obtained had the thing been more elementary.

Dr. Blum spoke about advanced classes. My mind happens to run along the same line, because I thought of Newark Branch. Newark Branch has had classes for a number of years, and the majority of the fellows in Newark Branch can talk in chemical language; symbols don't scare them. So the question came, "Well, what could you do next year?"

In looking over the literature, I find that Dr. Watts wrote a very interesting book on a laboratory course in electrochemistry,—simple. It doesn't require much apparatus; that apparatus could be assembled and could be loaned from branch to branch. Just as soon as one branch would get through with measuring something with the potentiometer, that could be sent to another branch, and that could rotate. It is not necessary for every branch to have a complete electrochemical set, but it could rotate. I wrote to Dr. Watts, and asked him if he wouldn't revise that book, and bring it up to date. Dr. Watts pleads that he doesn't think there would be enough value if he did do it. I wrote to the publishers, and they said they would be glad to publish it if Dr. Watts would only revise the book. I think if the Society would ask Dr. Watts to revise his book that we would have an excellent text for advanced courses, and then, in addition, have some contributions towards simple apparatus that could be transferred from one branch to another, with instructions, and a fellow would know how to use a colorimeter,—nearly everybody is interested in the use of a colorimeter. It is very simple, but it requires some instruments for measuring, it requires instruction. And a fellow can learn that, and learn his cathode efficiency, and he is getting something that he can actually see in everyday practice, and that is the way to interest him.

MR. S. P. GARTLAND: I just want to say that during the last winter Rochester Branch undertook to conduct a class. I am in accord with what you say, that really the fundamentals of chemistry

should go along hand in hand. As Mr. Hogaboom has said, the symbols,—the average plater doesn't seem to get that. We had a very simplified form which met with much favor among the platers of Rochester. Our instructor happened to be one of our associate members, and each week he had a printed lesson, and we took this printed lesson, and we had to digest it, and the branch had purchased equipment, apparatus, and the members themselves were assessed or taxed $15.00 for their personal apparatus, and in that way they became much interested. It was a great source of pleasure, once a week, that the boys were eager to get to the meeting, and get their apparatus out, and when the instructor arrived the word was given, and each one, whatever the solution was to be analyzed, why, they started in. And then we would check, one on the other. We weren't satisfied with just taking one analysis; we even went as far as three and four. Sometimes we wouldn't be out of there until after eleven o'clock at night. It showed the real interest that they were taking in it. We only managed to get through nickel, chrome and copper, and we didn't get all the way through copper. But I feel that as we go along, and the plater begins to get to know what it is all about, why these reactions are occurring, then we will commence to get somewhere.

I know in our class we have two very progressive young men, and the first thing you know they wanted to get a little farther ahead, and on their own hook began to take up the study of symbols and so forth, and I noticed towards the last that they were using them. But they were doing this of their own accord.

I should have liked to have had some of our printed forms up here; it is very unfortunate that I came away this morning without them. They were so simplified. And as our President, Mr. Gehling, says, there are all sorts of text-books whereby you can conduct those analyses. Still, a great many of the branches are not yet up to the stage where they can go ahead and do that.

I feel that in our own class next year,—this first year we spent considerable time checking up the arithmetic, the conversion of the tables over to the metric system and so forth, we had to get all that, —we were three weeks getting that through before we started in. No doubt we will be only too pleased to co-operate and have a sort of a form drawn up where all branches could start out,—that is, with the exception of the ones that are farther advanced, like Newark, who naturally wouldn't want to take up the elementary

work again,—but a form of some kind could be drawn up to go by, that the classes in the different cities could start out together, and then in time they could have some form of diploma to award these foremen platers who have taken the interest.

As you know, in most cities there are men who feel as though they haven't got the time. You can't get them away, they have bowling parties or something else. But I might say here that our attendance on the average was very good. They started in and they stayed to the last; in fact, when it got up along the latter part of April and we were busy with our Convention we were holding one week a meeting on the Convention, and one week one on the class, and it got to be that the instructor would say, "Now, we don't want to talk Convention here now; we are going to get down to business on this class work."

So I really am in accord with what Dr. Blum says. We should have something we can all follow along, because otherwise one will be going this way and another will be going the other way.

MR. ALBERT HIRSCH: I wish to concur in what Mr. Hogaboom has said in reference to the class, and in anticipation of that I prepared this little brief note of what we did in Philadelphia this year, and I'll read it off.

Conductance of Electro-Platers' Classes

Conductance of a platers' class will be dependent upon the personnel of the class, and the equipment and time available; e. g., let us take an extreme case. Suppose we take men who know absolutely nothing about chemistry, who do not know a beaker from a burette, and where only two hours a week can be devoted to the subject.

In the way of an experiment last year, we took seventeen persons who knew nothing about chemistry and had only two hours to give for twenty-six weeks, and taught them the analysis of a chromic acid solution. Their ages were from eighteen to forty-five years old, all having experience in a plating room.

Procedure: Blum and Hogaboom's book was used for a text. The analysis was divided into five parts: Physical method of control, determination of sulphate, hexavalent chromium, iron and trivalent chromium.

First part: The lessons were laid out in detailed operations, each operation numbered 1, 2, 3, 4, etc. The sheets were also typewritten. For the physical method they were taught to take a sp. gr. reading

with a hydrometer and hydrometer jar; then to determine the chromic acid content from the reading so obtained and the table in Blum and Hogaboom's book.

Second part: The gravimetric determination of sulphate was taught. This gave them an opportunity to become familiar with an analytical balance, weights, crucible, desiccator, beakers, precipitation, ignition and necessary mathematics.

Third part: Volumetric determination of hexavalent chromium. Here they learned how to prepare standard solutions and standardize them. The preparation of the sample of the bath, manipulation of the burette, titration, recording of reading, were all new to them.

Fourth part: Iron was determined gravimetrically.

Fifth part: The solution from which the iron had been precipitated out was used for the volumetric determination of trivalent chromium.

The entire twenty-six weeks, two hours a week, a total of fifty-two hours, were consumed with this analysis. Each member of the class had an opportunity to use the apparatus from one to three times.

Reading assigned during the year was chapters on chromic acid, Blum and Hogaboom's, Bureau of Standards circulars No. 346 and No. 131.

Results: At least twenty-five per cent of the class are analyzing the chromic acid solution of their plants.

I wish to mention that no symbols were used. We simply got the symbols and names of the substances as we went along, and didn't spend any time teaching mathematics at all, except along with the particular part we were studying.

Now, on the question of mathematics, we had an experience in Philadelphia the same as Dr. Blum has had. When we would make a standard solution and have them analyze it, we would get fairly good results. But when the members analyzed a used solution, we would have all kinds of confusion, and I think that is largely due to the instructor, where the men are before him, very often he will find things wrong and correct them.

I think with the classes it is only necessary to have the class started, and the interest will grow after that gets started.

DR. BLUM: I want to make one comment on something Mr. Hirsch said, and I am telling you two extremes, and I am certainly

not going to defend the one I am responsible for, but I just want you to see the difference between them. Mr. Hirsch tells us that they took a chromic acid solution and worked twenty-six weeks, two hours each week, that is fifty-two hours, in the laboratory analysis of a chromic acid solution. Now, what we did, and I don't defend this at all, was that we had a class with fifteen lessons, three hours a week, making forty-five hours, and during that time we attempted to cover the analysis of twelve different solutions. And I see George Hogaboom shaking his head, and we agree 100% on this, I know now that it was a mistake. I say it, and that was undoubtedly what led some of our people to feel that they didn't know what it was all about; in other words, that they had to just go from one thing to the other so quickly,—you see, we were pressed for time a little bit with only two meetings a month, and with the people coming a considerable distance, we attempted what I know now was impossible, to cover a whole course in one year.

Now, the thing I am leading up to, because we have all got to reach results by a series of approximations, by learning and making mistakes and overcoming them, and I hope that we will overcome them, but the point I am leading up to is this, that it is pretty hard for any committee or board to draw up a set of directions that will take care of a class that is going to spend fifty-two hours on one subject, and another class that is going to spend forty-five hours on twelve subjects.

There are two extremes. I don't defend either of them. I may question in my own mind, just informally, as to whether it would be justifiable to spend as much as fifty-two hours on the subject of the chromic acid solution. I am just raising the question, not objecting to it at all, but I mean that is just one extreme, and it would be very hard to write out directions that would be sufficiently minute to take care of all that time in advance that is to be given to that. So that the thing that I want to point out is, anything that this committee or Bureau does in the way of preparing directions can only be an outline, it can only be a suggestion, a guide. The teacher and the class in each locality have got to adopt that,—adapt that, I should say,—to the conditions that they have.

I think that some of the platers have, with the best of intentions, gotten a wrong impression that Mr. Hirsch's committee can just sit down and make up a set of typewritten or printed instructions, and that they are going to fit every branch, every class in the coun-

try, that they will just follow them literally and then at the end everybody has learned the same thing, and you give them a certificate and it shows that everybody knows exactly the same as everybody else. It won't work out that way. I just want you to realize there must be considerable flexibility. I am 100% in favor of having outlines prepared, but those outlines must always be sufficiently flexible to take care of the branch that wants to give a lot of time to one subject and another branch that is not able for good reasons to give so much time to the subject.

Now, I am going to raise this question, because it follows right directly,—the question of outlines for courses. I believe the best thing that you folks and the branches that you represent can do, when you go back,—and don't wait till fall to do it, but now,—is to send to Mr. Hirsch every scrap of directions that you have,—outlines, directions, laboratory records, everything that you have, showing what you have done during the past several years in your platers' classes, so that someone, Dr. Graham, for example, who has been very active in making up the course, can take those courses, —here is the course the Bureau of Standards has, fifteen lessons; here is Rochester Branch; here is some other branch; each gotten up by some different instructor with different ideas. Now, in the nature of things, they are not going to agree, but, frankly, they are not going to contradict each other; they are going to supplement each other. And Dr. Graham—I suggest him because he is right there in the city with Mr. Hirsch—can go over that and can pick out a good point anywhere he finds it, make a little modification or change or suggestion, and get together an outlined set of directions which would be far better, I am sure, than anyone could hope or attempt to prepare himself. I say that knowing that from discussions I have had with Dr. Graham and others everyone necessarily thinks of some new ideas, and, moreover, this whole thing is formative. Good Lord! If I were trying to teach today with the ideas that I had five years ago, I know it would be a mistake, and I hope that my ideas will be as different five years from now as they are now from five years ago. So let's not try to get too fixed, not try to put it all down in black and white, and we are through with it for the rest of our lives, and the platers twenty-five years from now can still be following the same set of directions.

Is there any reason why the branches cannot send to Mr. Hirsch complete instructions that they have used in their branches, whether mimeographed or printed or what not?

MR. HOGABOOM: I just want to bring up one point. You said they spent fifty-two hours to learn how to analyze chromic solutions. Aren't you forgetting that they became familiar with apparatus, familiar with terms, familiar with handling things, and next year they probably can analyze twelve solutions in the fifty-two hours, because they now know the fundamental principles? Whereas, if they had scattered all their energy upon the different solutions, they wouldn't have had the intense knowledge, or the fundamental knowledge that they have now, of volumetric analysis, gravimetric analysis and calculations.

DR. BLUM: I think you are perfectly right, Mr. Hogaboom, and, moreover, we must realize that in all this instruction the purpose is not nearly so much to teach them how to do certain things. They can all get a set of directions, and if a man has a head on him and a little patience, and particularly if he has some background, he can do that thing. But the principal purpose of these classes is to give background; in other words, to give confidence, to give experience.

MR. ALBERT HIRSCH: Mr. Hogaboom just covered our whole idea of the thing, and that is, looking forward to next year, we hope to cover the balance that we had not covered previously.

DR. BLUM: On the other hand, that point again just reiterates what I suggested before, that after the men have gone through these things, two or three years from now, then they will want something more advanced, and there is where we have got to be prepared. Just by way of illustration,—I don't limit it this way,—that if we had an outline for a course in analysis and one in general on elementary chemistry, one in electrochemistry, and perhaps one in metallurgy or metallography, and then in each of those cases ultimately we might develop a beginners' course and an advanced course. So that you would have a succession of years. Now the way it works out in different branches,—a large branch that has a few hundred members may very well have two classes going on at the same time, because there are enough new folks coming up to be able to provide a beginners' class at the same time they have an advanced class. But a small one like Baltimore-Washington, for example, can't run two classes at the same time. But we have got to be prepared to take a little different method; in other words, each time

we go over a thing, making it harder for the benefit of those that have had previous experience. Now, is there any more discussion on this general subject of the scope and outlines of these courses? You notice I am trying to avoid details, because if we started to discuss here whether you should titrate a nickel solution this way or that way, or something else, we would take a whole week instead of an hour. But I am just trying to get the principles in order to help Mr. Hirsch in his work.

Certificates

MR. ALBERT HIRSCH: I would like to say, in reference to the certificate, in Philadelphia, the Board of Education provides a certificate for a three-year course. The men there get credit for every twelve hours they put in. They can get six credits a year, and it is necessary for them to come three years to get eighteen credits, which entitles them to a certificate, embossed and all, with "Electro-Platers' Class," and so forth.

DR. BLUM: I think we can very well go on to that subject,—certificates to those who attend; something to show they have completed a course. This year we have had fifteen classes, and we gave simply a typewritten certificate to each member of the branch who attended 75% or more of the classes. In other words, we considered that that was completing the course. If the man was there for eleven or more out of the fifteen classes, we considered he had done the work of the course.

I think that the suggestion has been made or referred to that the Society as a whole have a general form of diploma or certificate, even though it was filled in and signed locally,—that might give a little bit greater weight and standing and prestige to a certificate of that kind. What do you folks think about that? Should the Society as a whole provide a standard form of certificate which then would perhaps be issued by the different branches under certain regulations?

MR. WHITEHEAD: I think that would be a fine incentive.

MR. WALTER FRAINE: Mr. Chairman, it is all very well for us to talk about instructing platers; there is a great advantage, wherever it is possible, to have these classes to go through the work. But when we talk of giving certificates as showing that a member has been taking these courses, has finished a certain amount of work, and this certificate indicating that he has acquired a certain profi-

ciency, a satisfactory proficiency in the work,—if the Society should issue a certificate of that kind, I think it would be a detriment to us, for this reason. In your city schools, a certificate of any kind merely means that they have taken the course and gotten a certain amount of knowledge, or made a certain degree of satisfactory progress in it. Now, that is all very well, to issue in a general way, but when you put behind it the backing of this organization, as you would do with such a certificate, and pass it out to a man simply because he has taken three-fourths of the course, we will say, what has been regarded as a satisfactory attendance to entitle him to a certificate, it doesn't mean a thing about the qualifications of that man, and after he has got that certificate it could probably be traded on in the effort to impress the employers that the man holding it was equipped satisfactorily to do certain work in connection with his own work, and we would be putting the seal of our confidence in the man's ability to do it. I am afraid if a policy of that kind were adopted, that the tendency would be, in many of the branches, at the end of the course, to issue that certificate to a man that had attended the required number of meetings, without any regard to the progress the man had made in mastering his job. And if it really meant that the man became proficient and was able to do that job satisfactorily, then well and good, but I think there would be more of a tendency to be lax in the issuing of a certificate of that kind, and we as an organization would suffer from it because the man who got one, who failed to make good, failed to acquire the necessary proficiency on the job, and then was bound to be unsatisfactory in the work in the plant,—I think there would be a reaction on the part of the employer as to the worth of any such certificate from an educational standpoint.

DR. BLUM: If I interpret Mr. Fraine's remarks as putting a slightly different expression,—Mr. Fraine would feel that any such certificate should be based on some sort of a test or examination which would show that a man had attained some definite accomplishment. That is, I take it, your feeling, if given at all?

MR. FRAINE: Not quite, Dr. Blum. My thought was that the issuing of these certificates would be used in order that a man might have a certificate, whether he had acquired the necessary proficiency or not. There is no governing rule that we could put into effect that would compel a satisfactory examination of a man after he had attended these sessions, to determine whether he was

qualified to receive a certificate which set the approval of this organization on his ability to do certain work. I think we would lose by issuing a certificate of that kind.

DR. BLUM: That is what I meant, that unless the organization could hold an examination which would be a guarantee of accomplishment, the certificate would be unwise. Is there any further discussion on that point?

MR. ALBERT HIRSCH: The Society never lost anything by giving a gold medal to a paper that was presented every year, and I don't see how the Society could lose anything in giving a certificate. Mr. Fraine forgets, as Shakespeare said, that we are the children of larger growth, and the certificate, I think, is necessary and would be ideal.

MR. FRAINE: Might I answer that? As to gold medals, I think I have a comeback. A gold medal is issued by a committee appointed by this Society to pass on work submitted in the way of a paper, or work done. And that work must receive the approval of a committee which is supposed to be qualified to pass on the value of the work. Now, in that case, it is merely a personal matter. And while it is very, very pleasing, it doesn't mean that it carries any particular weight or authority when he goes out in his daily work. It means more or less that the paper has been submitted, or the work done has been outstanding for the year along this particular line, and as such has received the approval of the committee appointed by the Society itself, to determine what has been the most satisfactory paper or work done during the year, and it is entirely distinct in its relation to the man and the job, as compared with a certificate issued by the Society to a member in our branch. Let's take our branch as the goat. Suppose that we want to keep harmonious relations in the branch, and we have a class in chemistry; say three-fourths of those members go through the course. They acquire a certain knowledge. 25% of them attend 75% of the sessions, and if that is used as a base to award a certificate, no matter how much or how little they have learned in regard to the work they have been carrying on in those classes, there is nobody to prevent the branch itself from awarding them a certificate, and I think it is the abuse of that, the leniency with which these certificates would be issued, that we would find a bad reaction to the Society as a whole.

DR. BLUM: Do you feel, Mr. Fraine, that that same objection would apply to nearly the same degree if the certificate was simply a certificate from the branch, stating that a man has completed such and such a course? No doubt the man might use it, as you point out, as an argument for securing another position, or an increase in salary, and of course it would at least be an evidence of his interest in education.

MR. FRAINE: I think it would be bad, because after all, there is no standing, practically, behind the majority of our branches that would give any weight to a certificate issued by the branch. Now, say these classes were conducted in the public schools, which are available for the purpose, and if, as Mr. Hirsch has outlined, they were given credits through the Board of Education for the amount of work done, there would be no objection at all to a certificate of that character, because it is entirely aside, and doesn't at all implicate this Society, and if he wants to use that as a matter of recommendation, why, well and good. But for us to do it, without having any control over the amount of work accomplished or the proficiency acquired, we would have a bad reaction.

DR. BLUM: I have to agree with Mr. Fraine in this respect:—It may seem inconsistent because just a month ago, I signed a dozen or fifteen such certificates for our branch. But if you were to ask me to certify how much each one had learned out of the course, I might have some misgivings, because with all due respect, speaking quite impersonally, I know some people got three or four times as much out of that course as others did or could.

MR. GEORGE HOGABOOM: A good man does not require a certificate. I happened to teach a class in electro-plating a good many years ago, 1910 to 1913, in an electrical school, and I had a man come to me, started electro-plating—his first knowledge of electro-plating. He didn't get a certificate. Today he excels as a teacher—Oliver Sizelove.

MR. PERSON: I think this question of certificates or diplomas is a very important one, so that at the start we don't want to make any mistakes in it. That is, if a certificate just means that a man has attended a certain number of hours at the class, that is one thing. But I think the tendency for the firm who employs that man is going to interpret that as meaning that he knows a certain amount about the work. Now, it is only human nature that we are going to try to get the most we can out of things, and I can

readily see where a man will attend those classes without getting very much value out of them, and get his diploma or certificate, and use that in trying to get a job. That was Mr. Fraine's argument, as I understand it, and I think we should be very careful to start this thing out right, in issuing certificates, especially if it is done by the Supreme Society. And it might be well to have a committee or a number of men, look into this pretty thoroughly before any decision is made on it.

DR. BLUM: There is another phase of this subject of recognition or encouragement which can be discussed quite independently of this matter of certificates. I am just introducing now the proposals that have come to me from one or another source that I jotted down so we can consider them, and that is this possibility, that some prize or award be given to the branch which has the largest proportional attendance at 75% or more of the classes of any regular course during the year. That might stimulate branch activity. For example, suppose that one branch with 200 members had a class with an average attendance of 50 at that class, and another class, with fifty members, had an average attendance of twenty-five at their class. Then, of course, the smaller branch would have a 50% average attendance. That is, of all the possible membership who could attend that class, they would have had 50% attend, whereas a larger branch might have a smaller proportional attendance, although they had a larger class. Is there any expression of opinion on that? That was made to me by one of our own members of the Baltimore-Washington Branch, that we could encourage the formation of attendance and interest of these classes by having some sort of prize or award given only to the branch that would show that they had the highest proportion of actual members of the branch attending the class during the year. Are there any remarks on that suggestion?

MR. W. F. FOX: It occurred to me that if the Supreme Society was willing to give any kind of a recognition to what the classes do, they could select the instructor, and the instructor would give them an examination of some kind, what was required to make this diploma or whatever you give, of some value. In other words, before a person was issued this diploma, he would be able to pass a certain examination up to a certain point in this course that was laid down. In that way, I can see no reason why the Supreme Society would be taking any chances if they got the right kind of

instructors, and if the platers pass a satisfactory examination and the course is taken. Then I would say that the diploma would have some real value, it would have something back of it to show that this plater, when he presents that, can do certain things satisfactorily, and it would be really authentic and amount to something.

DR. BLUM: Are there any comments on this latter suggestion—the possibility of awarding not any individual diploma, but a prize of some sort?—It might be a certificate or call it what you will —to the branch each year that has the largest average proportional attendance in their classes.

MR. H. H. WILLIAMS: I think the fact that it would be published in the REVIEW would be sufficient honor and reward for any branch in a case of that kind. It does sometimes create a little rivalry in a contest, but I have my doubts whether it would be sufficient, in a case of this kind, to offer anything of a definite nature at this time.

DR. BLUM: At least you would suggest that the Educational Bureau acquire all that information and publish it in the REVIEW so that the branch that had the best standing would get credit for it?

MR. WILLIAMS: The publicity would be the reward.

DR. BLUM: I think that is a very good suggestion for the committee. That is one thing I don't believe the committee has, and it ought to have, and that is records of the classes and registration and attendance. We don't know—I don't believe that Mr. Hirsch could tell you with any authenticity, how many classes were held last year, what was the enrollment in those classes, or what was the average attendance. I happen to have those statistics for the Baltimore-Washington Branch right here, but I doubt that I have sent them to Mr. Hirsch. I don't think I have. So that is just a good illustration of the fact that that information ought to be sent to the chairman.

MR. HIRSCH: Detroit is the only other branch that sent in a complete syllabus of the class, record of attendance and so forth. I also have a report of the Philadelphia class, but I didn't turn it in.

Fees

DR. BLUM: There are still one or two questions that might be raised regarding the conduct of the classes—the question of fees

for classes. Of course, that involves payment to teachers and so forth. I realize that here again each branch will be governed by local conditions, but I would like to get an expression of opinion on a general principle, and I can illustrate that by our own branch. We conducted the class for two years. The laboratories of the Bureau of Standards were given free to the platers, through the approval of our director, and for two years, my associates and myself instructed the class without any recompense of any sort. Then, a year ago, in discussing the subject with some of the officers and members of the branch, it was felt proper to charge a fee for the class and to pay the instructors in the class a small amount, necessarily small, but in order to increase the self-respect and interest of the persons taking the course. The net result was that the fee for the members was $5.00 for a course of fifteen lessons, which you will agree was not prohibitive, and each of the three instructors who was there each evening was paid $5.00 for the evening's work, which of course involved the preparation of the lessons and the equipment and solutions beforehand, so that again I think you will agree that the fees to the instructors were not excessive. At least I know I didn't get rich out of it. But I want a general expression of opinion as to whether it is wise and desirable for the branches always to pay the instructors and to charge a fee. This apart from what the amount of that may be for the classes.

MR. F. J. HANLON: I believe that it is thoroughly feasible to pay an instructor. You take in a branch like Chicago, we have innumerable chemists who can teach, and who are capable teachers. But therein lies the danger. Unless we can select one from every supply house in the city, and have him in the classroom as a laborer in the vineyard, we are out of luck, because we are showing partiality to the man that we select. So by going out indiscriminately and having the branch decide whom they will have for an instructor that year, and pay him a fee, so that we won't be under any obligations, has been the best system we could find for our condition.

MR. WALTER FRAINE: It always seems to me that if a thing is worth while, it is worth paying for. And in connection with that, we value those things we pay for much higher than we do the things we get for nothing. Now, to conduct a class, and get the most out of it for the membership, more will be gotten if the mem-

bers have a financial interest in the course, because they will feel that they have got so much money invested in it, they will want to cash in on that investment, and consequently, interest will be stimulated, attendance will be better, and the work will be more intense. From that one angle alone, I think a fee should be charged. On the other hand, a competent instructor who gives his time to the preparation of lessons, his time to instruct in a class, revising any papers that may be used for examples, or anything of that kind, certainly should be remunerated for his time and his trouble. I think you get out of that two things. You have a higher interest on the part of the instructor, because the one man is paid for the work he is doing, and the students are paying for the attention the other man is giving. So in each case, there would be a better relationship between them than there would be if you had a volunteer instructor. Again, a paid instructor will feel that he has got to put a little more effort into his preparation for the class's work than he would do if he were a volunteer. I think that the students would get more out of it under a paid instructor than they would on an unpaid basis. Again, there is a certain amount of material, apparatus, that has got to be used; there is a certain amount of breakage that takes place in these classes, and some way or other, unless each man provides his own equipment, the loss through breakage must be taken care of. That could be taken care of if a fee is charged, and would make a more satisfactory condition all around. I believe they should pay a fee for the work.

Equipment

DR. BLUM: That reference to equipment brings up another phase which again, I know, is going to be different with different branches, and that is as to whether the members should be asked or required to purchase equipment. Now, of course, if you go to a public school, they usually have the simple or regular equipment there. In the Bureau of Standards, it happened that all the equipment was there, there was no way to pay for it, in fact, there was no way to pay for the breakage, even. That simply had to be considered as part of the experience. In other cases, if the class is given in a private laboratory of any sort, then somebody has to buy and pay for it. One thing that has been pointed out is the desirability of helping the members to get a set of equipment to take into their own plant to make use of the instruction after they

have had the instruction in analysis. It is no use, for example, for a man to take fifteen lessons or twenty-six lessons on the analysis of any solutions, and then go into his plant and next year have no burette or pipette, or anything else that he needs in order to analyze the solution. So that I think those two things are distinct, but still related in the sense that a branch should encourage and try to provide the means by joint purchase, for the people to get equipment.

In our own case, I am frank to say that we found very few members of Baltimore-Washington Branch that were sufficiently interested, that did not already have the equipment that they wanted to buy equipment for analysis. But I believe that ought to be always encouraged, if possible.

Speakers and Expenses

Now, if there are no further remarks on the subject of classes, I would like to take the brief remaining time to get suggestions for the Educational Board on the subject of speakers at meetings. As Mr. Hirsch has indicated, they are endeavoring to get a list of speakers to go to various branches, not only in order that they may present subjects of interest to those branches, but that they may thereby arouse an interest in education, help the program, and support the branches. I do not know just how successful this Board has been in getting a list of speakers, but I am going to be very frank in saying that I hope that they will succeed, with the cooperation of the branches, in getting a larger number and a larger variety of speakers than you have had heretofore. And I see George Hogaboom nodding his head, because George and I get on too many programs. Now, I can say it right here, because it has been announced by the Chairman of your Bureau, that I spoke so many places, and George Hogaboom spoke so many places. I hope that we brought something that was of interest to the members. But the fact remains that there are lots more people through the country. The fact that we have here a program with twenty or thirty papers on it, shows that there are that many people in the country who have got something of interest to platers. Remember, the attendance of platers at this Convention is about 250, out of 1500. That is only one sixth of the platers throughout this country. Some of you, of course, will go back and tell them about what was reported in some of the papers that were presented here. But on

the other hand, I am pretty confident that in any given territory where the distance is not too great, a number of these speakers will be glad to speak to branches within a few hundred miles, presenting either these same or related subjects, so that those who do not come to the Conventions get the benefit of their experience and research work.

There is another thing, a question that is inevitably tied up with this question of speakers, and that is the question of expense of the speakers. Now, here again, if I seem to be personal, you will understand that it is intended to be entirely impersonal, when I say that it is a mistake for the branches to depend on speakers that they can get for nothing, whether it happens to be me, or George Hogaboom, or somebody else. Because the branches are thereby limiting themselves to those persons who for one reason or another are able to render the service without expense to the branch. I say, all credit to any firms who are willing and able to send their men out in order to help in the education of platers, but I do say, without any hesitancy, and I want to be contradicted if you people differ with me at all, that the branches must be more and more prepared to pay for the expenses. I am not talking about paying any fee to the speakers, but paying the expenses of the speakers just the same as Walter Fraine said they should pay for the expenses of the classes. Because in that way, they will be more free in the selection of their speakers, and of their subjects, if they can say to a man, whether he is at a university, or where he is, "Will you come down and give us a talk on such and such a subject, and we will pay your expenses?" Because otherwise somebody has to pay his expenses, either his employer, or he has to pay it out of his own pocket. It isn't fair to ask him to pay it out of his own pocket, and with all due respect, it isn't fair to ask the employer to pay it, because then either directly or indirectly, there is an implied obligation. I say that in no criticism of the firms who are willing and generous enough to furnish the expenses of the speakers. So that I think that that question is perhaps more important even than the payment of an instructor. Whether the the branches are willing to pay a reasonable sum toward the expenses of those speakers. And I say reasonable because here is where the Educational Bureau can work out something, and that is by routing those people so that if a man can speak for example to five branches in one territory, we will say five branches

in New England in one week—I have done it, I know that it can be done there, with one night stands there—that if a man can do that, his expenses for each branch will be relatively small, say $25.00.

During the last few years, to be frank, because of a shortage of appropriations, I have had to frequently tell branches when they asked me to speak that I would be glad to speak, but we have no appropriation to cover it, and if they paid my expenses I would be glad to come. And under those circumstances, they invariably have done so. And not only electro-platers, but other technical societies, co-operating, and the expenses were rather small. Now, suppose, for the sake of argument, that the expenses of a speaker to a meeting should be as much as $50.00, and suppose that the average attendance at that address will be fifty members. That is $1.00 each. I just lay this suggestion before you, that if the speaker isn't worth a dollar to hear, hesitate very much about asking him to come a long way to talk to you.

I have spoken rather frankly on this thing because I am more independent, I mean I can speak more freely because normally my expenses are paid by the Government, whenever the appropriations are available. But I would like to get some expressions of opinion on those questions.

Mr. George Hogaboom: I think one of the things that we are overlooking is the development of speakers. I think we need that more than we need the circulation of the present speakers. We need the development of speakers. The man in charge of the educational work at Newark Branch, Pete Oldham, spoke to me about it, and made this suggestion, and I would like to just offer it, that the man that is looking after that, the librarian, that he make a list of all the members and classify them according to their work. For example, you have members in your branch that are excellent at gold plating; you have others that are excellent at nickel plating, you have others good on chromium plating. Classify those men, and hold a chromium plating night, and see that each one of those fellows speaks on it. And if you get those fellows up on their feet and talking about it, the first thing you know you are developing a speaker. And I know that every branch has men that are a little bit more proficient in one line than they are in others. And those fellows can get up and give their experience. And if there are six or seven or ten get up and give their

experience that night, why you are encouraging the men to get on the floor, and become accustomed to hearing their own voices, which is the hard thing of speaking.

DR. BLUM: Mr. Hogaboom has referred to another phase of this question, closely related and equally important, and here is where I possibly differed with some of the suggestions of the Educational Bureau, in one letter at least. It was suggested that each branch should have an outside speaker for each meeting. I think it would be a mistake, because we must develop our own members, and in our Baltimore-Washington Branch, we tentatively plan to have an outside speaker for every other meeting, so that at alternate meetings we would put our members on their own resources, that we would call on the man who is doing job plating of this or that kind, to tell how he does it. One of the most interesting talks we had during the year was by a man, a practical plater, without any scientific or technical knowledge, who gave a talk on polishing there. There was nothing highly technical, and there may not have been anything that was new in it to the membership at large; but there was a man who knew polishing and all the kinks, and his ideas and so forth on it, and that was one of the most interesting meetings that we had during the year.

We want, as Mr. Hogaboom has said, to develop our own people. It would be a great mistake to depend too much on outside speakers. But I would be glad to get suggestions on that line, and also on the way we should get and pay for outside speakers.

MR. ALBERT HIRSCH: That wouldn't interfere with the idea of financing the proposition. I have harbored the thought, with this idea of financing, the thing could be turned into a source of revenue either for the branch or the Bureau of Education. By that I mean that there be lectures held where there is admission charged, and they not only could get the expense of the speaker, but they also have a source of revenue from that.

MR. WHITEHEAD: Along with the suggestion of developing the talents of the individual members of our own branches, it probably would be a wise thing for the secretaries to note any exceptional papers given by the individual members, and then circulate to the other branches, and by that method you will have available an outside man. I don't know whether I have made myself exactly clear, but if you take as an example Newark Branch, if we have a young man that presents an exceptionally good paper, that is

well taken, that man's name could be circulated to the other branches, and put down as an outside speaker, who has a paper that would be of vital interest to the other branches.

DR. BLUM: I think that is a very good suggestion. Now are there any further remarks on this subject? It may seem we have jumped pretty well around the whole field of classes and speakers and meetings, and if anybody was to ask any one of us here to put down in black and white just what has been accomplished by this meeting this morning, it would be a very difficult and possibly dangerous thing to do. But on the other hand, I would be very greatly disappointed if anyone believed that with 150 people or more here this morning, in spite of the temperature and so forth, and the time and energy that we have given to this thing, that no good would come out of it. This Society is a society, as we said in the beginning, for the promotion of the science of electro-plating and the education of electro-platers. I have been fortunate enough to be associated with your Society for something over fifteen years. I think it was in 1915, at any rate, it was the Dayton Convention, that I had the first good fortune to attend a meeting of this Society. Many people have commented to me during this Convention on the difference in the papers and programs and discussions and what it was just eleven years ago at Rochester. I'll tell you, this organization has no reason to become discouraged or pessimistic about its progress. I say frankly that at times, with our local branch, where some questions come up, difficulties arise, personalities may even be introduced there in some of the discussions, and where we are so close to the thing, we may, I may, even get a little bit discouraged and wonder whether we are getting anywhere. But when you come to a meeting like this, and find an attendance and interest like this, in spite of business conditions, in spite of weather conditions, then I say that it is anything but an occasion or cause for pessimism or discouragement. The Society has advanced, it has progressed, it has changed just as much as the faces and figures of the men have, since they took their pictures in Rochester eleven years ago. But the best is yet to be. I want to just suggest here, as it is one of the few opportunities I have to speak to the group as a whole, and in general terms, I want to just suggest the thought that the future of this Society can be, and I am sure will be, immeasurably greater than the past, or than perhaps any of us can visualize at the present time. And I just say this, that the

extent to which those possibilities are realized, will depend more than anything else on just the two subjects that we have discussed today. What kind of classes are you going to have? What interest, attendance, support and success are you going to have with your classes during the next ten years? And what kind of meetings and speakers are you going to have? Our good times, our social times, are fine things, and I say that I value highly the friendships that I have made through our meetings together, our sociability and so forth. But the Electro-Platers' Society is a society that is organized with a definite constructive purpose, and we must all go together, unitedly, chemists and platers, working together in order to advance the electro-plating industry, which when you come right down to it, we are all engaged in, and all dependent upon both for our livelihood and for our happiness. I thank you. (Applause.)

Obituary

We are sorry to learn that Mrs. Jacob Hay, wife of the Chairman of the Research Committee, passed away on September 3, at Ashtabula, Ohio, after a lingering illness.

Mrs. Hay's body was taken to Kenosha, Wisconsin, for burial. Mr. Robert Stuernagle, of Milwaukee Branch, Messrs. Frank Hanlon, Robert Meyers, Ernest Lamoreaux and Secretary-Treasurer H. A. Gilbertson were the bearers.

The sympathy of our entire membership is extended to Mr. Hay and family in their bereavement.

BRANCH NEWS

NEW YORK BRANCH

The regular meeting of the New York Branch was held on Friday, August 28, 1931, at the World Building. President Liguori called the meeting to order at 8:15. Minutes of the previous meeting were approved as read. A summons meeting was called to decide whether the branch should increase their donation to the Research Fund. The branch voted to continue the regular donation of $50.00 per year.

Mr. Benjamin Minken was elected to active membership in the branch.

There were many charter members of the A. E. S. present, and New York Branch had an old time meeting. Our regular librarian was absent, and President Liguori appointed Past President Stremel to act as librarian. He put plenty of pep in the meeting.

Among the questions were:

Question—What is a good strip to remove German silver wire very rapidly from a beaded ornament?

Answer—Nitric acid standing 40 degrees Baumé, using hot.

Question—How to chrome plate monel metal screws?

Answer—Plate direct in chrome tank for 15 minutes.

Question—How to plate chrome steel in a nickel tank?

Answer—Use a 30 per cent muriatic solution direct current before plating in nickel, and then transfer to the chrome solution, or it can be plated direct in the chrome.

Question—How to plate stainless steel knives?

Answer—Give the knives a strike in concentrated solution of sulphuric acid, using reverse current before plating in the silver solution.

There were many discussions on using carbon bisulphide in silver solutions as a brightener and using calcium chloride as a brightener.

The meeting was well attended and was adjourned at 11:30.

JOSEPH MUSANTE, JR., *Recording Secretary.*

CHICAGO BRANCH

The regular monthly meeting of the Chicago Branch, A. E. S., was held September 12, 1931, at the Atlantic Hotel.

Meeting was called to order with President J. C. Kretschmer presiding and all officers present.

Mr. J. Hay, chairman of the A. E. S. Research Committee, thanked the Chicago Branch on its prompt and liberal action on the branch's contribution to the A. E. S. Research Fund.

Mr. H. Faint gave a talk on a very interesting subject of impurities in chemicals used in the plating room.

Two applicants, Mr. C. H. Bailey of Rock Island, Ill., and Mr. G. A. Nagel of Rockford, Ill., were elected active members.

President J. C. Kretschmer was requested to make preliminary plans for a class in chemical analysis of plating solutions. All members interested in this class do not fail to attend our next meeting, October 10th, 1931.

After business affairs had been attended to, President J. C. Kretschmer turned the meeting over to our librarian, O. E. Servis.

Question—What causes nickel to chip in handling after plating when it is lightly hit? The work is properly cleaned and cyanide and acid dipped before plating. The sol. is run at 90° F., pH 5.8 to 6.0. What could be done to decrease the adhesion of the plate?

Answer—Nickel too brittle, or cleaning is not done right.

Question—What causes nickel to deposit on the side of a steel tank when the tank is apparently insulated from cathode rods?

Answer—Not advisable to use steel tank.

Question—When stampings made of bright cold rolled steel are cadmium plated and scratch brushed, shiny or bright spots appear. What is cause?

Answer—It is very easy to scratch brush cadmium. Keep your brush clean with pumice stone. Cadmium is easy to oxidize.

E. G. STENBERG, *Secretary and Treasurer.*

LOS ANGELES BRANCH

The regular monthly meeting of this branch was held August 12 on the ninth floor of the Chamber of Commerce Building. There were forty members present.

Communications were read and ordered filed. All bills were ordered paid.

A letter from Supreme Secretary Gilbertson, regarding the voluntary contribution of $2.00 per member per year for the support of research work, was read and voted down. Los Angeles Branch voted to donate $50.00 this year toward the research program.

Three new members were elected to the Los Angeles Branch: C. A. Robertson, active, and A. A. Bissiri and Dr. S. Fischer, honorary members. Two applications were received from William H. Beegle and Royal M. Stutzman.

Delegate M. D. Rynkofs read the delegates' report on the Rochester Convention. Mr. Rynkofs presented the report in such detailed form that those present imagined they were at the Convention themselves. He also outlined his plant visits in Rochester, Buffalo, Pittsburgh, Detroit and Chicago on his return trip to Los Angeles. Following this report, Dr. S. Fischer, author of his paper "Science and Practice of Electro-Plating" read at the Convention, read same to the members present.

Dr. S. Fischer also read R. J. O'Connor's paper on "Barrel Rolling and Plating."

To wind up a good, typical platers' meeting, a two-reel film was shown by the courtesy of the American Brass Co.

The question box discussion was held over until the next meeting.

FELLOW MEMBERS OF THE AMERICAN ELECTRO-PLATERS SOCIETY:

Do You Realize the Value of Your Membership in the Society?

A Little History of the Los Angeles Branch

January, 1929—Rumors of starting a Los Angeles Branch.
February 4, 1929—23 charter members signed.
May 31, 1930—92 members on our roster.
May 31, 1930—Cash balance May 31, 1930, $312.48.
May 31, 1931—96 members on our roster—1 transfer to San Francisco—4 members suspended for non-payment of dues.
May 13, 1931—Cash balance on hand, $468.28.
May 13, 1931—Due L. A. Branch from members, $149.00.

???? What Does 1931 and 1932 Hold Forth ????

You are aware of the fact that dues are only 50c a month or $6.00 per year. One problem alone solved is worth that several times over.

The shop owner who is a member is repaid the cost of membership a hundredfold from information at the meetings and the MONTHLY REVIEW, his exchanging of ideas with fellow members and the social contact with fellow craftsmen.

The foreman plater is certainly shortsighted if he fails to see the benefit of his membership. Science of electro-plating is advancing steadily. Qualifications of the foreman plater are becoming more stringent each year, and the man who expects to hold HIS OWN must keep up with the times.

Poor work represents the difference between loss and profit to his boss; naturally a foreman is expected to produce a profit. Draw your own conclusions. No one man can know it all, but each contributing a little means in the aggregate a whole lot.

The MONTHLY REVIEW, if continuously read, gives you many items of value which mean added efficiency.

Send in your dues for 1931 to 1932, a bill for which is enclosed. Always keep a clean slate.

M. D. RYNKOFS, *Secretary.*

The regular monthly meeting of this branch was held September 9 on the nineth floor of the Chamber of Commerce Building, with a large number of members and friends present to celebrate California's Admission Day. The Secretary read a few communications, which were ordered filed. Financial report was given up to date. All bills ordered paid. Two new members were elected as active members as follows: Royal M. Stutzman and W. H. Beegle.

It was moved and seconded to appoint a committee of three to arrange details for a fish dinner picnic to be held at Anaheim Landing private beach. The main idea will be to catch the fish, and that's going to be up to Messrs. Francis, Robinson, Wilde and a host of others. If they can catch fish on a desert, they certainly should have *some* luck pulling a few out of the Pacific.

Librarian Earl Coffin took over the meeting and read a Convention paper on "Chromium Deposits Directly on Aluminum," by H. K. Work and Charles J. Slunder. Also the "Ironical" talk by R. M. Wagner on "Manufacture of Chromium Plater Parts."

Both papers were well received, after which the meeting adjourned at 10:30.

M. D. RYNKOFS, *Secretary.*

WATERBURY BRANCH

September 11 was one of the warmest evenings of the season, and the heat had its effect in the attendance of the meeting of Waterbury Branch. However, a fairly good percentage of the membership were present and enjoyed the short session. Leroy Miller, newly elected president, presided. An interesting account of the recent Convention held in Rochester was given by Ellsworth Candee, branch representative on the Bureau of Education. Announcement was made at the meeting that Hartford-Connecticut Valley Branch would hold its first meeting in Waterbury Monday evening, September 28. Arrangements are being made for a large turnout, it being sort of a get-together party for the three Connecticut branches. Librarian Wm. Cavanaugh and his assistant, Ellsworth Candee, announced that they were working on a program of speakers for the fall and winter meetings. The speaker for next month's meeting, which will take place Friday evening, October 9, will be Robert Leathee, president of the International Fellowship Club. Action in communications received from Supreme Secretary were laid over to a future meeting.

W. F. GUILFOILE, *Secretary.*

ROCHESTER BRANCH

Rochester Branch held its monthly meeting at Hotel Seneca on Friday evening, September 18, with Vice-President Elster in the chair.

Applications of John Jordon, Rochester, N. Y.; Le Roy Dortader, Utica, N. Y.; Joseph Nowak, Buffalo, N. Y., were received, and they were elected active members of Rochester Branch.

Mr. G. A. Lux, our teacher, gave a very interesting talk on his ideas of the coming school year, and he was instructed to carry out his intentions. We expect school to start early in October. Mr. Gartland is interested in cleaning tripoli off aluminum castings. If anyone has a good idea we would be pleased to have it.

On Saturday afternoon, September 19, Rochester Branch with their families and friends enjoyed an outing and clambake at the Old Homestead on Irondequoit Bay. We had a very large attendance, and all enjoyed one of the best outings ever held by our Branch. The ball game between teams captained by Past President Reama and Vice-President Elster was won by the Reama boys. The work of the umpires, Mr. Frank Kalb and Mr. S. P. Gartland, was almost satisfactory (?). Prizes were won by Mr. and Mrs. Wm. Wolfe, Mrs. C. R. Wheeler of Elmira, N. Y., Miss Sarah Crowley, Mr. Geo. Scobell. The clam-eating prize was won by Mr. Joseph Ruff of Buffalo. Where he put so many clams we would like to know. Music for the dinner and dancing was furnished by the Stark Melody Boys. A feature of the evening was the showing of our last Convention pictures by Mr. Harold Dorsey. The committee in charge are to be congratulated—Mr. Frank Kohlmeier, Mr. G. A. Lux, Mr. S. P. Gartland, Mr. C. A. Reama, Mr. Fred Glitzer, Mr. J. R. Elster and Mr. Chas. Griffin.

CHAS. GRIFFIN, *Secretary.*

PHILADELPHIA BRANCH

The regular monthly meeting of the Philadelphia Branch was held at the Harrison Laboratory, U. of P., on Friday night, September 11, with President Harry Snyder presiding.

The attendance was good considering the excessive heat that night. The application of Roland Luther Hoenstine was read and referred to the Board of Managers for investigation and approval.

The Board of Managers reported favorably on the following applications: Jess. E. Quinby, active, 1816 Kinsey St., Philadelphia, Pa.; Edward B. Sanigar, associate, 5042 Stenton Ave., Philadelphia, Pa.; John Yengling, associate, 10 Chestnut St., Philadelphia, Pa.; Henry M. Writer, associate, 3rd and Sedgeley Ave., Philadelphia, Pa.; and on motion were elected to membership.

The following members were suspended for non-payment of dues: Wm. M. Fisher, 654 Gordon St., Reading, Pa.; T. D. Gaul, 440 Woodward St., Reading, Pa.; C. R. Moyer, 529 Philadelphia Ave., Boyertown, Pa.; M. Reynolds, 1809 Berryhill St., Harrisburg, Pa.

It is with deep regret that we announce the sudden death of our fellow member, W. A. Lambert of Johnson City, N. Y.

After reading Secretary-Treasurer Gilbertson's quarterly report of the Supreme Society and several other communications, the following committees made their reports:

Geo. Long, chairman of the Banquet Committee, reported everything coming along fine. The banquet will be held at Adam's, 13th and Spring Garden Streets, on Saturday, November 21, 1931. The committee promises a very good educational program at 3:30, and a real Phila. banquet at 7 p.m.

Everybody write down the date Saturday, November 21, the Saturday before Thanksgiving.

The Educational Committee, J. J. Basch chairman, announced that Dr. A. K. Graham will be the speaker at the October 2nd meeting, and it was voted to make this meeting an open meeting. Members are requested to invite their friends who are interested in our Society's doings to come out and attend this meeting.

Registration days for the platers' classes were announced as September 15 to 21. Class nights will be every Tuesday, 7:30 p.m., at the Mastbaum Vocational School. Instructor Hirsch announced anyone desiring to do some experimenting and research work in the deposition of rubber can do so at the class laboratory. Rocky Massicote will also give instructions and demonstrate the metalizing and finishing of non-metallic articles at these classes.

Director Gehling of the 1932 Convention outlined his plans for the Philadelphia Convention. The headquarters will be at the Benjamin Franklin Hotel, and the dates will be June 20, 21, 22 and 23, 1932. It is believed this early date will avoid the extreme heat around the first of July.

Registration will be $1.00, and there will not be an advertising program. All educational sessions will be held during the day and no evening sessions, as all entertaining will be taken care of during the evenings.

The educational sessions will be divided into three divisions: Technical, comprising papers from colleges and technical societies. Industrial, papers

from our associate members connected with industrial plants and supply houses. Platers' division, papers from our active members and reports of our research associate, and reports from the Research and Educational Committees.

Reports of the Rochester Convention delegates were read by Delegate Sam. Lunbeck.

Through the courtesy of the Rochester Branch, motion pictures of the recent Convention were shown and enjoyed by all, and a rising vote of thanks was extended to the Rochester Branch for the use of the film.

Sam. Lunbeck—My views as a delegate to the Rochester Convention do not give me anything startling to bring back to the membership. The papers, while of the usual high technical quality, did not, so far as I saw, give anything new of especial value to the average plater. (All the papers and discussions are published in the Convention proceedings, and members can borrow this book from the librarian of the branch.) The paper of Dr. Work on plating aluminum was, to my mind, the outstanding feature, and I feel that the plater should heed and be prepared to make use of the information therein. There are so many new developments taking place in the use of aluminum today that the plater will be called on to plate on that base all the finishes that he now plates on other base metals.

Note—There is a very fine booklet, "Electro-Plating Aluminum," that can be had by writing on your firm's letterhead to the Aluminum Co. of America, Pittsburgh, Pa.

The cleaning of metals satisfactorily and economically is one of the largest problems the plater has today. Since I began chrome plating six years ago I, as everyone else, have run into many problems that we did not know existed. There are so many hidden causes for uncleaned work that we never knew to exist that one has yet a lot to learn before he can feel perfectly safe on any job that confronts him.

The exhibits were very creditable, and while Philadelphia Branch did not participate in any of the awards, the display of the Philadelphia Branch was a credit to its members, and as chairman of the Branch exhibits I want to thank those who responded. Mr. Wm. Bannan of the Hubly Mfg. Co., Lancaster, Pa., had a very fine display of color finishes on cast iron and a whole farm of dogs of all breeds which attracted considerable attention. Mr. Quinby of the Fox Gun Co. had a fine display board of fishing reels, etc., which was very pleasing. Lieutenant Willink of the Frankford Arsenal had a display of chromium plated punches and dies, gauges, etc., in accordance with his talk given before this branch the past season, and Speakman Co. as usual was represented by your delegate.

The next Convention, as you already know, was voted to the Philadelphia Branch, and I was pleased to learn through the *Quaker City Reminder* that our past supreme president, Geo. Gehling, has been made Commander-in-Chief of the Convention Committee. That in itself assures a real Convention for Philadelphia Branch, but we must all get behind and push. Don't think George can do it all. Let's show the platers that we can have a real Convention along different lines.

Everybody out and boost for the best in 1932.

After some further discussion, the report was received, and a rising vote of thanks was given the delegates for their able manner in representing the Branch at the Convention.

Meeting adjourned at 11 p.m. until the first Friday in October.

Jos. E. UNDERWOOD, *Secretary-Treasurer.*

DETROIT BRANCH

Detroit Branch held its regular monthly meeting September 4 at the Statler Hotel—President Jos. H. Hansjosten presiding.

Under the heading of the Reports of Committees the members of our branch were treated with the brief outlines of the doings at the Convention at Rochester by our able President, who was chairman of our delegates, and in closing he was given a rising vote of thanks. We are pleased to note that Detroit Branch was honored in having one of its members, Mr. Chas. Marker, elected to the second vice-presidency of our Society, and we are sure he will meet every expectancy.

The meeting closed with the customary question and answer period, conducted by our librarian. But, due to the warm weather and the members just returning from their vacations, the questions were few, and it turned out to be just a get-together affair.

But wait and see.

CHAS. M. PHILLIPS, *Secretary and Treasurer.*

DAYTON BRANCH

The regular monthly meeting of the Dayton Branch, American Electro-Platers Society, was held Saturday evening, September 5, at the Y. M. C. A., with our president, Mr. Cusick, presiding. Minutes of the previous meeting were read and so approved. The regular business of the branch taken care of, the meeting was turned over to the Convention delegates for a report on the doings of the Grand Convention.

Mr. Fraine gave quite a lengthy description, in which he told of the ready response of the different branches in regard to the appeal for funds to carry on the research work at the Bureau of Standards. Dayton Branch went on record as pledging its support to the research fund.

Mr. McReady and Mr. Van Deran also reported on the Convention, Mr. Van Deran telling of the interesting trips taken through the factories and the advantages of seeing how the other fellow is doing his job.

Dayton Branch is planning to conduct another chemical control class this winter, and it is believed the class will have a larger enrollment than last year, and we hope the same interest and enthusiasm will prevail. Those attending the class last winter feel that they were doubly repaid for the time spent and the small monetary expense attached. We feel at this time that a note of thanks should be extended to our fellow member, Mr. Wm. Hohman, for his interest in the class and his kindness in providing a place to conduct these meetings.

WARD PROTSMAN, *Recording Secretary.*

APPLICATIONS

Branch

CLARENCE H. BAILEY, R. I. Mfg. Company, Rock Island, Illinois.....Chicago
WM. H. BEEGLE, 226 N. Johnston St., Los Angeles, Cal.....Los Angeles
DR. S. FISCHER, 2007 West Third Street, Los Angeles, Cal. (Honor)
Los Angeles
ALBERT L. FRY, 162 Uhland Terrace, N. E., Washington, D. C.
Baltimore-Washington
HENRY MEERINGS, 350 21st Ave., San Francisco, Cal.....San Francisco
BENJAMIN MINKEN, 1944 75th Street, Brooklyn, N. Y.....New York
JOHN S. NACHTMAN, 408 Belvedere St., Warren, Ohio (Assoc.)....Cleveland
GEO. A. NAGEL, 317 8th Street, Rockford, Illinois.....Chicago
THOS. F. O'CONNER, 1844 Lake View Avenue, Rocky River, Ohio....Cleveland
W. STUART PANKEY, 1075 59th Street, Oakland, Cal.....San Francisco
C. A. ROBERTSON, 827 S. Plum Street, Ontario, Cal.....Los Angeles
WALTER SHELTER, 726 Macon Street, Brooklyn, N. Y.....New York
A. GORDON SPENCER, 1901 East Euclid Ave., Detroit, Mich. (Assoc.)
Detroit
PAUL W. STRAUSSER, Bureau of Standards, Div. 5, Sec. 6, Washington, D. C.
Baltimore-Washington
R. M. STUTZMAN, 1214 E. Slauson Street, Los Angeles, Cal.....Los Angeles
RALPH WELLRING, 1211 Appelgate Avenue, Elizabeth, N. J. (Assoc.)
New York
A. B. WILSON, 801 E. Court Street, Flint, Michigan.....Detroit

ELECTIONS

CLARENCE H. BAILEY, R. I. Mfg. Company, Rock Island, Ill.....Chicago
WM. H. BEEGLE, 226 N. Johnston St., Los Angeles, Cal.....Los Angeles
A. A. BISSIRI, ...Los Angeles
LE ROY DORTADER, Utica, N. Y.....Rochester
S. FISCHER, 2007 West 3rd St., Los Angeles, Calif.....Los Angeles
JOHN JORDON, Rochester, New York (Active).....Rochester
HENRY MEERINGS, 350 21st Ave., San Francisco, Cal.....San Francisco
BENJAMIN MINKEN, 1944 75th Street, Brooklyn, N. Y.....New York
JOHN S. NACHTMAN, 408 S. Belvedere St., Warren, Ohio (Assoc.)
Cleveland
GEO. A. NAGEL, 317 8th Street, Rockford, Illinois.....Chicago
JOSEPH NOWAK, Buffalo, N. Y. (Active).....Rochester
THOS. F. O'CONNER, 1844 Lake View Ave., Rock River, Ohio.....Cleveland
W. STUART PANKEY, 1075 59th Street, Oakland, Cal.....San Francisco
JESS. E. QUINBY, 1816 Kinsey St., Phila., Pa. (Active).....Philadelphia
C. A. ROBERTSON, 827 Plum Ave., Ontario, Calif. (Active).....Los Angeles
EDWARD B. SANIGAR, 5042 Stenton Ave., Phila., Pa. (Assoc.).....Philadelphia
WALTER SHELTER, 726 Macon Street, Brooklyn, N. Y.....New York
A. GORDON SPENCER, 1901 East Euclid Ave., Detroit, Mich. (Assoc.)
Detroit

Branch

R. M. STUTZMAN, 1214 E. Slauson Street, Los Angeles, Cal.....Los Angeles

RALPH WELLRING, 1211 Appelgate Avenue, Elizabeth, N. J. (Assoc.)
New York

A. B. WILSON, 801 E. Court Street, Flint, Michigan.....Detroit

HENRY M. WRITER, 3rd and Sedgeley Ave., Phila., Pa. (Assoc.)
Philadelphia

JOHN YENGLING, 10 Chestnut St., Phila., Pa. (Assoc.).....Philadelphia

SUSPENSIONS

R. ARNOLD, 1224 North Central Park Ave., Chicago, Illinois.....Chicago

CHAS. COPLEY, 6 Stewart Avenue, Nutley, N. J.....Newark

WM. M. FISHER, 654 Gordon St., Reading, Pa.....Philadelphia

T. D. GAUL, 440 Woodward St., Reading, Pa.....Philadelphia

JAMES GERITY, 2412 Rosewood Avenue, Toledo, Ohio.....Detroit

M. GREEDER, 5319 Montrose Avenue, Chicago, Illinois.....Chicago

THOS. HEAME, 614 Garfield Avenue, Jackson, Michigan.....Detroit

WILLARD HULTS, 20 South Mountain Road, Milburn, N. J.....Newark

A. E. JOHNSTON, 100 Chestnut Street, East Orange, N. J.....Newark

T. KEATING, 53 Ellington St., East Orange, N. J.....Newark

A. KING, 23 Franklin Street, Newark, N. J.....Newark

MATHEW LANG, 3220 Bellevue Avenue, Detroit, Michigan.....Detroit

G. E. MCGURE, 55 South 20th Street, East Orange, N. J.....Newark

E. MCLAUGHLIN, 381½ Springfield Ave., Newark, N. J.....Newark

C. R. MOYER, 529 Phila. Ave., Boyertown Pa.....Philadelphia

FRED OLSEN, 511 Park Ave., Brooklyn, N. Y.....Newark

CHAS. REUTER, 27 North 5th St., Newark, N. J.....Newark

M. REYNOLDS, 1809 Berryhill St., Harrisburg, Pa.....Philadelphia

F. SCHNEIDER, East Rutherford, N. J.....Newark

WM. STOUT, 3139 Wellington Avenue, Chicago, Illinois.....Chicago

R. F. WEAVER, 718 Highland Ave., Newark, N. J.....Newark

HENRY WINERMAN, 347 Hillside Ave., Newark, N. J.....Newark

RESIGNATIONS

GEO. CONELY, 14 Wambleman Avenue, Belleville, N. J.....Newark

REINSTATEMENTS

EDGER FREEMAN, 144 Valley Avenue, N. W., Grand Rapids, Michigan

DEATHS

W. A. LAMBERT, Johnson City.....Philadelphia Branch

Mr. Irvin H. Hahn announces the death of one of the members of the Baltimore-Washington Branch, Mr. Harry Shapiro.

What Is Success?

It's doing your job the best you can,
And being just to your fellow man;
It's making money, but holding friends,
And staying true to your aims and ends;
It's figuring how and learning why,
And looking forward and thinking high;
And dreaming little and doing much;
It's keeping always in closest touch
With what is finest in word and deed;
It's being thorough, yet making speed;
It's daring blithely the field of chance
While making of labor a brave romance;
It's going onward despite defeat
And fighting staunchly, but keeping sweet;
It's being clean and it's playing fair;
It's laughing lightly at Dame Despair;
It's looking up at the stars above,
And drinking deeply of life and love;
It's struggling on with the will to win,
But taking loss with a cheerful grin;
It's sharing sorrow, and work and mirth,
And making better this good old earth;
It's serving, striving through strain and stress,
It's doing your noblest—that's Success.

—Author Unknown.

This is a contribution from Mr. Ward Protsman, Recording Secretary of Dayton Branch.

A Case of Scotch

President Silas Strawn of the United States Chamber of Commerce told a Washington reporter a bootlegging story.

"A Scotchman," Mr. Strawn said, "settled over here, and a bootlegger got in touch with him and sold him a case of Scotch that roused his suspicions, so he put the stuff in his car and drove round to an analytical chemist's to have it analyzed.

"The chemist analyzed the Scotch and said: 'This is wood alcohol, poison. If you drink it it won't kill you, but it will blind you, sure.'

"The Scotchman nodded. Then he took up his case of Scotch and started for the door. But the chemist said:

" 'Surely you're not going to drink it! Remember, it'll blind you if you do.'

" 'Oh,' said the Scotchman, 'I won't drink it, never fear; but I know a blind man I can sell it to.' "

Nothing Doing

"Hard times," said City Manager Alfred T. Cutter on the Cape May beach, "hard times don't seem to cramp the modern girl. She'll expect a man to spend $10 on her where her mother would have been satisfied with an expenditure of $1.

"A bank clerk proposed to a modern girl here on the beach the other night.

" 'Darling,' he wound up, 'you could live on $35 a week, couldn't you?'

" 'Yes,' she laughed, 'but no longer.' "

Life's Lesson

While yet a child, on ocean's shore,
I gazed across the restless sea;
I heard the music of the roar
And wondered what it meant to me.

In those sweet years I longed to sail
'Mid treasures rare of ages' lore;
I set my canvas to the gale
And steered my vessel far from shore.

With joy I sailed the summer sea
While skies were bright and winds were fair,
But storms soon disappointed me
And drove my vessel here and there.

And when arose the tempest wild,
It tossed my ship on billows wide,
It swept me back where as a child
For joy and pleasure I had sighed.

Ah! well, if we could only know
In early years, so sweet and kind,
What joy and pleasure from us flow
As we leave childhood years behind.

—Bernhart Paul Holst.

RESEARCH COMMITTEE

Chairman, JACOB HAY.....6929 Ottawa Ave., Chicago, Ill.

Sec.-Treas., WALTER FRAINE.....507 Grand Ave., Dayton, Ohio

S. E. HEDDEN.....227 Fifth Ave., Aspinwall, Penn.

WILLIAM F. GUILFOILE.....14 Oakland St., Waterbury, Conn.

DAN WITTIG.....1221 N. Third St., Milwaukee, Wis.

DR. WILLIAM BLUM.....Bureau of Standards, Washington, D. C.

MR. OSCAR SERVIS.....5305 Warner Ave., Chicago, Ill.

MR. N. E. ZADOWSKI.....1383 W. 65th St., Cleveland, Ohio

MR. W. S. BARROWS.....628 Dovercourt Road, Toronto, Canada

C. F. NIXON.....Ternstedt Manufacturing Co., Detroit

DR. H. S. LUKENS.....University of Pennsylvania, Philadelphia, Pa.

BUREAU OF EDUCATION

Chairman, MR. ALBERT HIRSCH.....1945 Airdrie St., Philadelphia

Branch Representatives:

Chicago Branch.....HAROLD FAINT

Waterbury Branch.....ELLSWORTH CANNON

Los Angeles Branch.....M. D. RYNKOFS

New York Branch.....HENRY LEVINE

Philadelphia Branch.....DR. A. K. GRAHAM

Baltimore-Washington Branch.....DR. WM. BLUM

Cleveland Branch.....J. C. SINGLER

Hartford-Connecticut Valley.....TENNANT ELWIN, FRANK J. CLARK

Worcester Branch.....M. H. FROMMANN

Toronto Branch.....C. KEMESH

Other Branch Representatives will be printed as received.

ANDERSON BRANCH

Meets first Monday of every month at 7:30 p.m. at the Anderson, Indiana, Y. M. C. A. R. M. Wagner, Secretary-Treasurer, 28 W. 12th St., Anderson, Indiana.

BALTIMORE-WASHINGTON

Meets in Enoch Pratt Library, Calhoun and Hollis Sts., Irvin H. Hahn, Secretary, 207 S. Sharp St., Baltimore, Maryland.

BOSTON

Meets at American House, Boston, Mass. First Thursday each month. Secretary, A. W. Garrett, 45 King St., Dorchester, Mass.

BRIDGEPORT

Meets first and third Friday of each month at Chamber of Commerce Rooms, Stratfield Hotel. Secretary, T. H. Chamberlain, 859 Orange St., New Haven, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p.m., Atlantic Hotel, 316 S. Clark St., Secretary, E. G. Stenberg, 2200 N. Kenneth Ave., Chicago, Ill.

CINCINNATI

Meets every Thursday, 7.30 p.m., at Vocational Training School, Spring and Liberty Sts. Secretary, Al Yeager, 2021 Sherman Ave., Norwood, Ohio.

CLEVELAND

Meets first Saturday of each month at Hotel Winton. Paul R. Stamm, Secretary, 947 Elbon Road, Cleveland Heights, Ohio.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Ward Pretsman, 141 Westwood Ave., Dayton, Ohio.

DETROIT

Meets the first Friday of each month at the Hotel Statler, Louis II Room. Secretary, Chas. M. Phillips, 18948 Hickory Ave., Detroit, Mich.

GRAND RAPIDS

Meets second Friday of each month at 522 Lake Michigan Drive, N. W. Secretary, Jacob Van Dyke, 1261 Union Ave., N. E., Grand Rapids, Mich.

HARTFORD-CONNECTICUT VALLEY

Meets fourth Monday in each month alternately at the Chamber of Commerce, 815 Main St., Hartford, and the Chamber of Commerce, 124 Chestnut St., Springfield. Secretary, Vernon Grant, 32 Jennings Road, Bristol, Conn.

INDIANAPOLIS

Meets second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1725 Union St., Indianapolis, Ind.

LOS ANGELES

Meets second Wednesday of each month at the Chamber of Commerce Bldg., 9th floor, 1151 S. Broadway. Secretary, M. D. Rynkofs, 1354 W. 25th St., Los Angeles, Calif.

MILWAUKEE

Meets second and fourth Thursdays of each month at Cor. 3rd and Highland Ave., Frank J. Marx, 1451 W. Cherry St., Milwaukee, Wis.

MONTREAL

Meets second and fourth Friday of each month at 1437 Aylmer St., Montreal, Quebec, Canada, where the Secy-Treas. Mr. Charles Doherty, can be found at any time.

NEWARK

Meets first and third Fridays of each month at Franklin Hall, 41 Franklin St., Newark, N. J., at 8 p.m. Secretary-Treasurer, Geo. Ruster, P. O. Box 201, Newark, N. J.

NEW YORK

Meets second and fourth Fridays of each month in the World Building, Park Row, New York City, N. Y. Secretary-Treasurer, J. R. Sterling, 2581 46th St., Astoria, L. I.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, J. E. Underwood, 327 N. 19th St., Camden, N. J.

PITTSBURGH

Meets first Friday of each month at 8 p.m., at downtown branch, Y. M. C. A. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 44 Washington St., Prov. Engineers Rooms, Providence, R. I. Secretary, J. E. Andrews, 19 Rosedale St., Providence, R. I.

ROCHESTER

Meet third Friday of each month at Hotel Seneca. Secretary, Chas. Gribbin, 34 Garson Ave., Rochester, N. Y.

SAN FRANCISCO BRANCH

Meets at Plaza Hotel, San Francisco. Secretary, H. W. McKibben, 810 Tehama St., San Francisco, Cal.

ST. LOUIS

Meets second Friday of each month at the Plant of the Lasalco Co., 2328 LaSalle St. Secretary, C. T. McGinley, 4214 Fairham Ave., University City, Mo.

TOLEDO

Meets first Thursday of each month at Toledo Secor Hotel, Cherry and Page Sts. James M. Lee, Secretary, Barker Street, Fremont, Ohio.

TORONTO

Meets fourth Monday of each month at Canadian Foresters' Hall, 22 College St., Room No. 2. Secretary, H. W. Graham, 102 Robina Ave., Toronto, Canada.

WATERBURY

Meets second Friday of the month at Engineers Hall, No. 11 East Main Street. Wm. F. Guilfoile, Secretary, P. O. Box 961, Waterbury, Conn.

WORCESTER

Meets Directors' Room, Chamber of Commerce, Worcester, Mass. Roger H. Bryant, Secretary, 94 Grove St., Worcester, Mass.